



Medical evidence deconstruction of traditional nourishing foods: A systematic review of clinical efficacy and safety

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Abstract

Background: Against the backdrop of rising global health awareness and population ageing, health-preserving interventions encompassing traditional Chinese medicine (TCM) regimens, dietary therapeutics, and industrial-produced dietary supplements have expanded rapidly. Public health decisions regarding these interventions are frequently guided by anecdotal experience rather than rigorous scientific evidence, potentially leading to resource waste and unrecognized health hazards. This narrative systematic review aims to appraise the evidence base for representative health-preserving approaches, establish practical appraisal criteria, and generate evidence-informed recommendations for clinical practice and public health.

Methods: Narrative systematic review methodology was adopted. Literature retrieval was performed across PubMed, Cochrane Library, and Embase. Representative interventions were grouped into three categories: TCM health-preserving modalities, traditional nourishing foods, and modern dietary supplements. Evidence from randomised controlled trials (RCTs), individual-participant-data meta-analyses (IPD-MA), and systematic reviews was synthesised. Key methodological confounders including funding bias, sample-size constraints, and population-specific effect modification were addressed. Five core appraisal principles for health-preserving interventions were formulated.

Results: Among TCM-derived interventions, acupuncture demonstrates high-grade evidence for chronic-pain management, with favourable safety profiles under qualified practitioners. Berberine shows moderate-level evidence for glycaemic regulation and may serve as an adjuvant metabolic intervention. Curcumin exhibits anti-inflammatory potential in rheumatoid-arthritis populations yet is substantially limited by poor oral bioavailability. Most compound herbal diets, constitution-based conditioning, and seasonal tonification lack high-quality human trial evidence and carry unquantified toxic-drug-interaction risks. For traditional nourishing foods, oral collagen supplementation shows disputed clinical benefits with prominent industry-funding bias; high-quality independent studies fail to confirm structural anti-ageing skin effects. Edible bird's-nest delivers inferior nutritional value relative to conventional complete protein sources, with minimal human clinical validation. Chicken essence yields preliminary evidence for athletic recovery, yet evidence generalisability to the general population remains limited. Modern dietary supplements exhibit pronounced population-dependent efficacy: omega-3 fish-oil confers cardiovascular benefits predominantly among patients with severe hypertriglyceridaemia rather than normolipidaemic healthy individuals. Vitamin-D benefits manifest only in deficient populations. Probiotic efficacy is strictly strain-specific. Routine multivitamin supplementation offers negligible primary-prevention gains for chronic diseases among generally healthy adults; β -carotene and vitamin-E supplementation carry documented harms in select subgroups. Five appraisal principles are proposed: prioritising well-conducted RCT evidence; valuing large-sample multi-centre studies; favouring high-impact peer-reviewed journals; scrutinising conflicts-of-interest and funding sources; and distinguishing therapeutic versus preventive effects and special versus general populations.

Conclusion: Health-preserving interventions display heterogeneous evidence grades. Indiscriminate universal supplementation should be replaced by targeted, biomarker-guided intervention strategies. Improving public evidence-based health literacy is essential to mitigate misinformed health consumption. Future research should prioritise ethnic-Chinese-population-specific data, standardised trial protocols for dietary supplements, and implementation frameworks translating evidence into public-health practice.

Keywords: Evidence-based medicine, health preservation, traditional Chinese medicine, dietary supplements, meta-analysis, health literacy

Introduction

Challenges in the Era of Proliferating Health-Preserving Information

Since the onset of the 21st century, growing global health consciousness and population ageing have jointly driven explosive growth in the wellness industry. Interventions range from TCM herbal diets, seasonal tonification, qigong and daoyin, to industrially manufactured vitamins, fish-oil, probiotics and plant extracts. Health products and regimens permeate everyday life via short-form online videos, social-media posts, commercial advertising and word-of-mouth. Global industry analyses report that the

worldwide dietary-supplement market has exceeded USD 150 billion, maintaining an approximate 7% compound annual growth rate and ranking among the fastest-expanding segments of the broader health sector. Nevertheless, consumer health choices are seldom grounded in scientific evidence; instead, they follow experiential logic: “purported effectiveness, benefits observed in others, presumed harmlessness, peace of mind”. Such decision-making squanders personal and societal resources and may conceal health risks. The core difficulty lies in the absence of standardised evidence-evaluation frameworks for health-preserving modalities. Unlike pharmaceuticals that

undergo rigorous phase-III clinical trials and regulatory review for efficacy and safety, dietary supplements and traditional regimens are subject to comparatively lenient regulation in most jurisdictions. Many products only need to demonstrate basic safety prior to market launch and may make broad health-claims without high-quality human efficacy data. Consequently, numerous products supported merely by *in-vitro* or animal-model findings or devoid of scientific backing, enter the marketplace and are marketed as panaceas. Alarming, some individuals' over-rely on food-based therapeutics and supplements while neglecting well-validated cornerstones of health: balanced nutrition, adequate sleep and regular physical activity, giving rise to distorted health perceptions. Leading medical bodies have repeatedly warned that many supposedly "harmless" supplements lack benefit and may inflict measurable harm in vulnerable subgroups. A large-scale systematic review commissioned by the U.S. Preventive Services Task Force (USPSTF) assessed dozens of vitamin and mineral supplements. β -carotene supplementation significantly elevates lung-cancer risk among smokers; routine vitamin-E supplementation yields no net benefit for primary prevention of cardiovascular disease or cancer and increases haemorrhagic-stroke risk (O'Connor *et al.*, 2022^[18]; US Preventive Services Task Force, 2022)^[18]. These findings contradict the "supplement-as-universal-remedy" narrative and underscore the urgency of building evidence-evaluation systems for health-preserving interventions.

Application of Evidence-Based Medicine in Evaluating Health-Preserving Practices

Evidence-Based Medicine (EBM) provides methodological tools to address evidentiary chaos within wellness research. Its core tenet holds that clinical and health-intervention decisions ought to rest upon the best-available research evidence rather than experience, traditional authority or expert opinion in isolation. EBM does not discard clinical expertise; rather, it requires expert judgments to be integrated with empirical evidence so as to maximise benefits and minimise risk. Within evidence hierarchies, the randomised controlled trial (RCT) represents the gold-standard study design for inferring causation. Random allocation balances known and unknown confounders between intervention and control groups; comparator conditions isolate true treatment effects from placebo responses; double- or triple-blinding mitigates subjective bias originating from participants, investigators and outcome assessors. Individual-Participant-Data Meta-Analysis (IPD-MA) further improves precision and statistical power. Unlike conventional meta-analyses synthesising aggregated published results, IPD-MA obtains raw individual-level data from included primary studies, re-analyses datasets under unified protocols, enables rigorous confounder adjustment, granular subgroup analyses, and handles cross-study heterogeneity, yielding conclusions more robust than summary-data meta-analyses. Systematic reviews and meta-analyses employ pre-specified comprehensive search strategies to retrieve all relevant literature, followed by standardised screening, quality appraisal and data-synthesis procedures. They overcome limitations of small single studies and inconsistent results, enhancing result stability and external validity, and constitute primary evidence sources informing clinical guidelines and public-health policy. High-impact medical

journals keep publishing large-scale systematic reviews and meta-analyses on wellness interventions. An IPD-MA by Vickers *et al.* (2018)^[24] incorporating 39 high-quality RCTs (20 827 chronic-pain participants) confirmed sustained analgesic effects of acupuncture superior to sham-acupuncture and routine care. The large-scale VITAL RCT (Manson *et al.*, 2019a, 2019b) randomised 25 871 healthy American adults; long-term follow-up demonstrated that daily 2000-IU vitamin-D plus 1-g marine n-3 fatty-acid supplementation conferred no primary-prevention benefit against cancer or cardiovascular disease. Although authoritative evidence accumulates, substantial gaps persist between research conclusions and popular beliefs.

Article Structure

This article follows the logical sequence of "methodological foundation-stratified evidence-based evaluation-principle formulation-knowledge-to-practice translation" and consists of eight sections. Section 2 elaborates the literature search strategy, inclusion and exclusion criteria, and evidence-quality appraisal principles adopted in this study, illustrating the methodological rationale and rigour underpinning this narrative systematic review. Section 3 establishes an evidence-stratified framework for traditional Chinese medicine (TCM) health-preserving modalities. According to the quality and strength of available clinical evidence, common TCM wellness interventions are categorised into four groups: "supported by high-quality research", "moderate evidence base", "promising potential constrained by technical limitations", and "insufficient evidence". Representative examples including acupuncture, berberine, curcumin, and traditional compound herbal diets are analysed in-depth respectively. Section 4 addresses pervasive misconceptions surrounding traditional nourishing foods. From the perspectives of nutritional physiology and metabolic mechanisms, it dissects the actual health benefits and nutritional positioning of three popular traditional tonics: oral collagen supplements, edible bird's-nest, and concentrated chicken essence, clarifying discrepancies between commercial marketing claims and scientific evidence. Section 5 systematically appraises clinical evidence for mainstream modern dietary supplements, covering four major categories: fish-oil, vitamin D, probiotics, and multivitamins. It delineates eligible populations, benefit boundaries and potential risks for each agent, correcting the misconception of "universal supplementation for all populations". Built upon evidence synthesised in preceding sections, Section 6 distils five core principles for evidence-based appraisal of health-preserving interventions and further explores actionable pathways for translating scientific evidence into clinical practice and public-health implementation. Section 7 discusses the limitations of the present study, analyses societal costs arising from unguided wellness-seeking behaviours from a health-economics perspective, and proposes recommendations for policy improvements. Section 8 summarises key conclusions of the whole work and puts forward concrete suggestions for future research avenues.

Methods

1. Literature-Search Strategy

This investigation implemented a narrative-systematic-review design. Distinct from formally registered systematic reviews governed by strict PICO

(Population, Intervention, Comparison, Outcome) frameworks and quantitative-grading of evidence certainty, narrative systematic reviews suit topics encompassing heterogeneous interventions across multiple research domains. They permit systematic collation and comparative analysis of diverse health-preserving modalities under consistent methodological standards. Three authoritative biomedical databases were interrogated: PubMed, Cochrane Library, and Embase. PubMed, the largest global biomedical repository, indexes most formally published clinical research with broad scope and timely updates. The Cochrane Library is the EBM field's cornerstone resource, housing high-quality systematic reviews and RCTs with authoritative methodological standards. Embase affords superior coverage of pharmacology, dietary supplements and complementary-medicine literature, compensating omissions from the other two databases. Combined searching maximised retrieval comprehensiveness.

2. Criteria for Data Inclusion and Exclusion

To guarantee the quality and relevance of included studies, strict inclusion and exclusion criteria were pre-specified for this review. Four prerequisites constituted the inclusion criteria. First, eligible study designs were restricted to randomised controlled trials (RCTs), individual-participant-data meta-analyses (IPD-MAs), systematic reviews, or meta-analyses. This restriction aimed to secure evidentiary reliability by excluding low-level evidence sources. As noted above, RCTs represent the gold-standard for causal inference, whereas systematic reviews and meta-analyses synthesise and upgrade existing RCT evidence. Only these designs generate sufficient evidentiary strength to support judgements regarding the effectiveness of health-preserving interventions. Second, studies must have been published in peer-reviewed English-language journals. Peer review constitutes a core academic quality-control mechanism that filters investigations with major methodological flaws and unreliable conclusions. Restricting eligibility to formal journal articles excluded grey literature such as unrefereed conference abstracts and theses, thereby ensuring the academic rigour of included records. Third, studies must involve human participants. This criterion accounts for translational gaps “from bench to bedside”. Findings from cell and animal experiments frequently cannot be directly extrapolated to humans; many bioactive agents demonstrating activity *in vitro* may fail to produce equivalent human effects owing to limitations in absorption, metabolism, or dosing. By focusing exclusively on human clinical evidence, this review avoids the common fallacy that “*in-vitro* efficacy equals human efficacy”. Fourth, outcome measures must comprise clinical efficacy endpoints or quantifiable physiological-function markers. Clinical efficacy endpoints include pain scores, disease-activity indices, bone-mineral density, and cardiovascular-event rates, which directly reflect intervention-related changes in health status. Physiological-function markers encompass blood glucose, lipid profiles, insulin concentrations, and immune biomarkers, capturing biological effects of interventions. Studies relying solely on subjective self-reported perceptions without objective quantifiable outcomes were excluded.

Four exclusion criteria were also applied. First, studies limited to cell-based or animal experiments with no accompanying human clinical evidence were excluded. As outlined previously, preclinical findings cannot serve as direct evidence for human health-preserving practices. Second, case reports, narrative commentaries, and conference abstracts were excluded. Case reports describe only individual patients and lack statistical representativeness while being susceptible to selection bias; commentaries reflect authors' subjective viewpoints rather than primary research evidence; conference abstracts present preliminary results without complete methodological and numerical detail, resulting in insufficient reliability. Third, under-powered pilot studies without subsequent validation were excluded. Pilot studies primarily assess feasibility of research protocols rather than therapeutic efficacy. They typically deploy small sample sizes associated with low statistical power and substantial random error; without subsequent large-scale validation, they carry no conclusive value. Fourth, publications with incomplete methodological information were excluded. Articles missing critical details concerning randomisation procedures, blinding strategies, comparator selection, or sample-size calculation cannot be appraised for methodological quality or conclusion reliability and were therefore excluded.

3. Evidence-Appraisal Principles

Rather than treating every eligible citation uniformly, this review performed multi-dimensional quality appraisal for each included publication to determine evidentiary strength and reference value across five domains. First, hierarchical study-design ranking. Inherent disparities exist in evidence grades across study types. Individual-participant-data meta-analyses and large multi-centre RCTs provide markedly higher-grade evidence than small single-centre trials. Among RCTs, double-blind designs yield greater credibility than single-blind or open-label designs. Conclusions from higher-hierarchy designs were prioritised; in the event of conflicting findings across evidence levels, results from higher-grade studies prevailed. For instance, the IPD-MA by Vickers *et al.* (2018)^[24], synthesising 39 RCTs, possesses substantially higher evidentiary standing than isolated small clinical observations and therefore served as the primary foundation for evaluating acupuncture efficacy within this review.

Second, sample size and statistical power. Sample size is a key determinant of result reliability. Smaller samples amplify random error and increase risks of false-positive or false-negative findings; large-sample investigations deliver more stable, precise effect-size estimates. Furthermore, multi-centre trials recruit participants across diverse healthcare settings and geographical regions, conferring superior external validity (generalizability) relative to single-centre studies. Accordingly, greater weight was assigned to large-sample and multi-centre study outputs during appraisal. Third, journal influence and stringency of peer review, although journal impact factor is not an absolute marker of quality, high-impact general medical journals (e.g., *New England Journal of Medicine*, *JAMA*, *The Lancet*) and authoritative specialty journals generally enforce rigorous peer-review standards and exacting methodological requirements, yielding higher average publication quality. In particular, systematic reviews

commissioned by authoritative bodies such as the US Preventive Services Task Force (USPSTF) follow more stringent methodological specifications and review procedures than original research published in ordinary journals and carry high reference value.

Fourth, conflict-of-interest status, this dimension is especially critical when appraising studies of dietary supplements and pharmaceuticals. Multiple investigations demonstrate that industry-sponsored clinical trials are significantly more likely to report positive outcomes than independently funded studies, a phenomenon termed funding bias. Industry sponsors may shape conclusions through study-design manipulation or selective outcome reporting. Industry-funded publications were therefore flagged and interpreted cautiously. When discrepancies emerged between industry-sponsored and independent studies, findings from independent investigations were prioritised. Fifth, outcome consistency and replicability. Conclusions gain substantial reliability when independently reproduced by separate research teams across diverse populations and geographic settings yielding concordant directional effects. Conversely, highly divergent or contradictory results indicate unstable intervention effects modulated by multiple unknown factors, precluding premature definitive assertions. Through comprehensive appraisal guided by these five principles, the present review mitigates biases and limitations stemming from individual studies and establishes a more holistic, objective, and robust evidence-base for evaluating health-preserving interventions.

Stratification of Traditional Chinese Health-Preserving Interventions

TCM health-promoting modalities occupy a paradoxical position: widely accepted culturally yet frequently dismissed within mainstream biomedicine as experience-based without scientific validation. This binary perspective oversimplifies reality. Research maturity varies drastically across different TCM interventions. Some possess abundant high-quality RCT support and international recognition; others have preliminary clinical data accompanied by notable limitations and controversies; numerous modalities remain purely experiential without rigorous human testing. A stratified evaluation framework is therefore required to differentiate evidence status.

1. Clinical Efficacy and Safety of Acupuncture

Acupuncture is among the most extensively researched and internationally accepted TCM therapies. The World Health Organization (WHO) lists dozens of conditions as acupuncture indications; multiple Western nations including the United States, United Kingdom and Germany reimburse acupuncture within healthcare systems. Acupuncture finds particularly widespread application for chronic pain, a major global public-health burden impairing quality-of-life and imposing socioeconomic costs. Conventional analgesic pharmacotherapy carries risks of dependence, gastrointestinal adverse-effects and tolerance, creating demand for safe non-pharmacological alternatives. Vickers *et al.*'s updated IPD-MA (2018) ^[24] represents the definitive acupuncture-for-chronic-pain meta-analysis. Thirty-nine high-quality RCTs enrolling 20 827 patients with back-and-neck pain, osteoarthritic pain, chronic headache and shoulder pain were included. By analysing raw

individual-subject datasets rather than published aggregate statistics, analytical precision and reliability were elevated. Acupuncture yielded statistically superior pain reduction versus sham-acupuncture and usual-care groups; observed benefits could not be fully explained by placebo effects. Notably, efficacy diminished merely ~15 % one-year post-treatment, indicating durable effects beyond transient symptomatic relief. Subgroup analyses suggested effect-size contrasts between real- and sham-acupuncture depended largely upon control-group intervention intensity rather than fine procedural details, implying both specific and non-specific mechanistic components. A separate meta-analysis by MacPherson *et al.* (2017) corroborated sustained benefits, supporting acupuncture as a reasonable referral option for chronic-pain populations.

For many years the neurobiological mechanisms of acupuncture remained incompletely understood. Functional magnetic-resonance imaging (fMRI) now permits objective observation of brain-activity modulation furnishing biological plausibility. Ma *et al.* (2026) published a systematic review-and-meta-analysis incorporating 17 high-quality RCTs (750 chronic-pain participants). Acupuncture significantly modulated activity within core pain-processing brain regions: anterior-cingulate-cortex and insula (MD = 0.27, $p < 0.00001$); primary-somatosensory-cortex and thalamus (MD = 0.30, $p < 0.00001$); default-mode-network (MD = 0.29, $p < 0.00001$). These circuits mediate pain-related affective perception, sensory integration and cognitive modulation, demonstrating multi-pathway analgesic action. Clinically, acupuncture lowered Visual-Analogue-Scale (VAS) pain scores (MD = -2.31, $p < 0.00001$) and improved pain-relief rates (OR = 4.30, $p < 0.00001$); pain-relief outcomes were rated high-certainty evidence under GRADE criteria. Neuroimaging data furnish objective biological grounding for observed clinical efficacy. Safety has been validated through large-scale prospective surveillance. White *et al.* (2001) ^[25] prospectively monitored 31 822 acupuncture consultations delivered by physicians and physiotherapists in the United Kingdom. Only 43 minors adverse-events were reported: local soreness, bruising, vasovagal responses, nausea and transient symptom exacerbation. No major adverse-events occurred. When performed by competent practitioners, serious complications such as pneumothorax, deep-tissue infection and spinal haematoma are extremely rare; risks are substantially lower than conventional analgesic pharmacotherapy. Collectively, efficacy, mechanistic and safety evidence classify acupuncture as a TCM health-preserving modality supported by high-quality research, with well-validated clinical value especially within chronic-pain management.

2. Metabolic-Regulating Evidence for Berberine

Berberine, an isoquinoline alkaloid extracted from *Coptis chinensis* and *Phellodendron chinense*, constitutes the principal bioactive constituent of the TCM herb Huang-lian. Traditionally employed for heat-clearing, damp-draining and detoxification in gastrointestinal infections and diarrhoea, modern pharmacology reveals broad metabolic-modulating properties including glucose-lowering, lipid-modulating and insulin-sensitising activity, rendering berberine one of the most intensively-studied natural-product candidates in TCM

modernisation research. Zhao *et al.* (2023) ^[31] published a systematic-review-and-meta-analysis in *The Journal of Nutrition* evaluating glycaemic outcomes. Twenty RCTs (1761 participants: healthy volunteers, prediabetic individuals and type-2-diabetes patients) were synthesised. Berberine significantly improved multiple glycaemic markers: fasting-glucose −0.52 mmol/L (95 % CI −0.72 to −0.33), glycated-haemoglobin (HbA1c) −4.48 mmol/mol, fasting-insulin −2.36 mU/L, HOMA-IR −0.85, post-prandial-2-hour-glucose −1.81 mmol/L, all statistically significant. Subgroup analyses suggested possibly larger fasting-glucose and insulin-resistance improvements in female participants, greater effects in diagnosed diabetes versus prediabetes or healthy subjects, and potentially superior responses among Asian compared with Western populations. Investigators emphasised that subgroup-difference evidence remains limited by study quantity and requires further large-scale dedicated trials for confirmation.

Mechanistically, berberine acts through multiple molecular cascades. It activates AMP-activated-protein-kinase (AMPK), the cellular energy-sensor, promoting glucose uptake, fatty-acid oxidation and suppression of hepatic gluconeogenesis. It enhances insulin-signalling transduction and insulin sensitivity. Gut-microbiome modulation via gut-liver axes additionally contributes to metabolic benefits, alongside direct inhibition of hepatic glucose output. Current evidence assigns berberine moderate-level supportive evidence for glycaemic modulation. Multiple RCTs demonstrate benefits, yet sample-sizes and methodological quality may be enhanced; long-term safety and durability require extended follow-up investigations. Clinically, berberine may serve as an adjuvant intervention superimposed upon lifestyle modification for prediabetes or mild glycaemic dysregulation but must never replace standard anti-hyperglycaemic pharmacotherapy. If patients with established diabetes utilise berberine adjunctively, physician supervision and close glycaemic monitoring are mandatory.

3. Anti-Inflammatory Evidence and Bioavailability Challenges for Curcumin

Curcumin is the primary bioactive polyphenol derived from *Curcuma longa*, the yellow pigment within curry. Traditional systems of medicine deploy turmeric for anti-inflammatory, analgesic and digestive indications. Modern pharmacology confirms broad anti-inflammatory and antioxidant bioactivity: curcumin suppresses pro-inflammatory-mediator production and neutralises reactive-oxygen-species to mitigate oxidative injury. Research interest is substantial for adjuvant management of chronic-inflammatory conditions such as rheumatoid-arthritis (RA). RA is an autoimmune disorder characterised by chronic synovial inflammation, causing joint swelling, pain, stiffness, deformity and functional impairment. Standard therapy relies upon non-steroidal-anti-inflammatory-drugs, glucocorticoids and disease-modifying-anti-rheumatic-drugs, all associated with notable long-term adverse-effect burdens, stimulating pursuit of safe natural anti-inflammatory adjuvants. Zhang & Niu (2025) ^[30] published a PRISMA-compliant meta-analysis in *Medicine*. Seven RCTs were synthesised evaluating curcumin for RA disease-activity and systemic inflammatory biomarkers. Curcumin significantly reduced

disease-activity and inflammatory markers: DAS28 weighted-mean-difference −1.47 (95 % CI −1.68 to −1.26); rheumatoid-factor −24.15 units; erythrocyte-sedimentation-rate −31.26 mm/h; C-reactive-protein −0.93 mg/L (95 % CI −1.33 to −0.53). All differences attained statistical significance. Under EULAR response criteria, DAS28 reductions exceeding 1.2 correspond to at-least-moderate clinical improvement, indicating curcumin yields clinically meaningful as well as statistically-significant effects. Sensitivity-analysis confirmed stable pooled effect-estimates; Egger's test detected no significant publication bias.

Nevertheless, clinical translation is hindered by severely low oral bioavailability, a shared bottleneck for numerous botanical-derived bioactive compounds. Pharmacokinetic constraints include poor aqueous solubility limiting gastrointestinal dissolution, restricted enteric absorption plus intestinal microbial degradation, extensive hepatic first-pass-metabolism converting curcumin into weakly-active metabolites, and limited target-tissue distribution. Consequently, conventional oral curcumin formulations seldom achieve tissue concentrations matching effective *in-vitro* assay levels. This discrepancy explains why potent *in-vitro* anti-inflammatory properties translate into modest, highly-variable human clinical responses. Novel delivery strategies under investigation include nano-micelles, liposomes, micro-encapsulation, and co-administration with piperine to suppress hepatic metabolic-enzymes. Pharmacokinetic profiles and clinical effectiveness of innovative formulations still demand dedicated RCT validation incorporating blood-level exposure assessments. Curcumin is therefore categorised as possessing adjuvant therapeutic potential constrained by bioavailability limitations. Its anti-inflammatory merit warrants acknowledgement; it may complement standard RA therapy but cannot substitute established anti-rheumatic treatment. Consumers ought to prioritise formulation-bioavailability characteristics over nominal ingredient content when selecting curcumin supplements.

4. TCM Health-Preserving Modalities with Insufficient Evidence

Contrasted against acupuncture, berberine and curcumin with substantial modern research track-records, many popular everyday TCM wellness modalities remain inadequately supported by contemporary evidence: compound herbal diets, constitution-pattern conditioning, seasonal tonification, and food-therapy soups. These practices are deeply embedded within cultural heritage with centuries-long experiential accumulation and high public acceptance yet lack rigorous clinical-trial validation under EBM standards. Multiple contributing factors exist. First, TCM wellness emphasises individualised pattern-differentiated interventions adapted to person, season and geography. This personalised paradigm creates intrinsic tensions with standardised-intervention requirements of RCT study-design, raising methodological hurdles. Second, multi-herb compound preparations exhibit complex constituent profiles, ambiguous active-ingredient identities and poor batch-to-batch standardisation, complicating clinical-trial implementation. Third, commercial incentives for conducting large-scale multi-centre RCTs are limited relative to pharmaceutical-industry-sponsored drug-development.

Insufficient evidence does not equate to proven ineffectiveness, nor does it guarantee safety. Some traditional regimens and medicinal herbs carry tangible health hazards. Aristolochic-acid-containing botanicals produce well-documented nephrotoxicity and carcinogenicity leading to irreversible renal injury and urothelial malignancy upon prolonged ingestion. Common tonics such as ginseng and salvia may augment bleeding risk when co-administered with anticoagulants. Chronic high-dose intake of certain herbal diets may increase hepatic-renal metabolic burden and precipitate organ damage. Furthermore, constitution-typology frameworks remain largely empirically-derived without universally-accepted, reproducible quantitative diagnostic criteria for “Qi-deficiency”, “Yin-deficiency”, or objective outcome metrics for tonification response. This creates commercial opportunities for marketing products underpinned by no scientific rationale. Applying EBM precautionary principles, long-term unsupervised self-administration of these low-evidence, risk-bearing wellness modalities is discouraged. When health-related needs arise, priority should be assigned to interventions with robust empirical validation or supervised consultation with qualified professionals.

Scientific Deconstruction of Popular Nourishing-Food Myths

The maxim “food-based tonification surpasses medicinal tonification” is deeply entrenched within Chinese-cultural wellness belief-systems. Traditional nourishing foods have become commercialised. Oral collagen, edible bird’s-nest and concentrated chicken essence represent high-cost premium nourishing staples heavily promoted to consumers. Nutritional science and clinical evidence frequently diverge sharply from marketing narratives and folk perceptions.

1. Evidence Controversies Concerning Oral Collagen Supplements

Oral collagen supplements dominate the beauty-wellness consumer-market, particularly among female purchasers. Marketing arguments rest upon two theoretical premises: first, ingested collagen molecules are absorbed intact and deposited within dermal tissue to replenish endogenous skin-collagen stores; second, digested collagen-derived small peptides function as signalling molecules stimulating dermal fibroblast collagen synthesis. Scholarly debate persists. An early systematic-review-and-meta-analysis (de Miranda *et al.*, 2021) ^[7] synthesising 19 RCTs reported benefits of hydrolysed-collagen supplementation for skin-ageing markers, findings widely cited within industry marketing materials. Subsequent scholarship has highlighted methodological-quality and funding-bias concerns. Myung & Park (2025) ^[17] published an updated meta-analysis in *The American Journal of Medicine* incorporating 26 RCTs with subgroup stratification by funding-source and study quality. Overall analyses failed to confirm structural anti-ageing benefits for collagen supplements. Critically, industry-funded studies were significantly more prone to reporting positive outcomes; effects vanished within high-quality independently-sponsored investigations. Much purported efficacy may therefore originate from research bias rather than genuine physiological action. Additional updated meta-analyses (Batool *et al.*, 2026; Danessa *et al.*, 2025) ^[3, 6] detected only minor improvements in subjective

skin-hydration or elasticity with negligible clinical-magnitude effects, without supporting wrinkle-reduction structural endpoints.

Physiologically, the “eat-collagen-to-replenish-skin-collagen” premise conflicts with basic gastrointestinal physiology. Dietary proteins are digested down to amino-acids and limited small peptides prior to intestinal absorption. Ingested collagen, eggs, milk or lean meat all ultimately deliver amino-acid pools redistributed systemically according to tissue demand. There exists no preferential routing of collagen-derived building-blocks towards dermal collagen biosynthesis. While *in-vitro* and animal-model data suggest potential peptide-signalling activity, human clinical relevance remains contested. Endogenous collagen synthesis is far more efficiently supported through adequate total high-quality-protein intake plus vitamin-C co-factor supply. For individuals pursuing skin-health goals, evidence-supported foundational strategies include balanced nutrition, rigorous photoprotection and adequate sleep, whose evidence strength vastly outperforms collagen supplements. Expensive collagen-supplement expenditure yields inferior value compared with fundamental lifestyle modifications.

2. Nutritional Analysis of Edible Bird’s-Nest

Edible bird’s-nest is culturally revered as a premium tonic reputed to nourish lung-yin, improve complexion and support post-partum recovery; high market-pricing additionally confers symbolic social-status value. Contemporary nutritional science demonstrates its real-world nutritional and health benefits are frequently overstated. Zhou *et al.* (2026) ^[32] published a narrative review within *Journal of Ethnic Foods* comprehensively evaluating composition, bioactivity, clinical evidence and industrial challenges. Chemically, edible bird’s-nest consists of >50 % protein plus substantial carbohydrate fractions alongside minor lipids and minerals; sialic-acid constitutes its most-emphasised bioactive marker. Traditional therapeutic claims rest almost entirely upon *in-vitro* and animal-experiment observations of antioxidant and immunomodulatory potential; rigorous human controlled-trial evidence supporting purported health benefits is sparse. Industry-sector challenges include rampant adulteration with gums, gelatin and agar, inconsistent quality shaped by swiftlet-species, harvesting geography and processing protocols, plus fragmented regulatory oversight enabling exaggerated marketing claims. Nutritionally, typical serving-sizes of dried edible-bird’s-nest are merely 3-5 g, delivering modest absolute-protein quantities inferior to a single chicken-egg. Its protein exhibits an incomplete essential-amino-acid profile with low biological-utilisation efficiency, lagging behind complete-protein sources such as eggs, dairy and lean meat. High market-price primarily reflects scarcity, collection-difficulty and cultural symbolism rather than unique nutritional potency. Equal financial investment into ordinary eggs, legumes, dairy and meat provides superior-quality nutrition at markedly lower cost. Further research priorities include standardised authentication methodologies, well-designed human clinical trials and sustainable-harvest ecological considerations. Until definitive evidence emerges, consumers ought to moderate expectations for edible-bird’s-nest health claims and avoid impulsive premium-priced consumption.

3. Clinical Evidence and Nutritional Positioning of Concentrated Chicken Essence

Concentrated chicken essence is a popular East-Asian nourishing preparation especially prevalent in Taiwan, Hong-Kong and Singapore, marketed for alleviating fatigue, boosting physical strength, supporting post-partum recovery and optimising examination-period stamina. Traditional production involves prolonged simmering of whole-chicken without added water to concentrate tissue extracts; modern industrial manufacturing utilises high-temperature-high-pressure extraction, yielding concentrated chicken-tissue hydrolysate. Key nutritional components comprise small-molecular-weight proteins and peptides, branched-chain-amino-acids, carnosine, anserine, taurine plus small quantities of water-soluble vitamins and minerals. Carnosine and anserine possess anti-oxidant and anti-fatigue properties; branched-chain-amino-acids participate in muscle anabolism and exercise recovery, representing proposed bioactive constituents. Ruangthai *et al.* (2025) ^[20] published a randomised double-blind placebo-controlled cross-over trial within *Functional Food Science*. Twelve amateurs-cyclist participants received 100 mL daily concentrated-chicken-essence or placebo for four weeks in cross-over sequence. Improvements were observed for maximal-oxygen-uptake, power-output and time-to-exhaustion; post-exercise reductions in creatine-kinase and lactate were accelerated, alongside differing immediate post-exercise glucose concentrations between arms. This study supplies preliminary clinical data for athletic-performance-recovery applications yet bears prominent limitations: very small sample-size (n = 12) restricted to young recreational athletes; uncertain generalisability to office-workers, post-partum women and other primary consumer-groups; limited four-week follow-up precluding conclusions on long-term efficacy and safety.

Nutritionally, concentrated-chicken-essence represents a concentrated animal-protein source whose constituent amino-acids and peptides can be obtained affordably via ordinary chicken, egg, dairy and legume dietary intake. Individuals achieving adequate dietary-protein require no supplementary chicken-essence. It retains practical merit for patients with poor appetite, impaired digestion or convalescent populations as an easily-assimilated protein source. Nevertheless, for generally-healthy well-nourished individuals, premium-priced chicken-essence supplementation confers minimal incremental value. In summary, preliminary low-grade evidence supports anti-fatigue and exercise-recovery effects; larger multi-centre trials are required for validation. Consumers should maintain realistic expectations and never substitute it for regular balanced meals.

Scientific Evaluation of Modern Dietary Supplements

Distinct from culturally-rooted nourishing foods, modern dietary supplements arise from industrial-manufacturing and nutritional-science progress, formulated with isolated or blended nutrient ingredients purporting defined health benefits. Fish-oil, vitamin-D, probiotics and multivitamins constitute four top-selling global categories. This section evaluates their real-world benefits, applicable-populations and potential risks drawing upon latest clinical evidence.

1. Fish-Oil

Fish-oil's principal bioactive omega-3 fatty-acids are eicosapentaenoic-acid (EPA) and docosahexaenoic-acid (DHA). Popularly marketed as universal cardioprotective and neuroprotective agents for middle-aged and older adults, large-scale contemporary RCTs have challenged conventional assumptions and sparked academic controversy regarding cardiovascular-disease prevention. Hu *et al.* (2019) ^[4] meta-analysed 13 RCTs enrolling 127 477 participants with mean-follow-up 5.0 years. After excluding the REDUCE-IT trial, marine-omega-3 supplementation correlated with modest reductions in myocardial-infarction, coronary-heart-disease death and composite cardiovascular-events, exhibiting dose-response relationships. Inclusion of REDUCE-IT strengthened pooled-benefit estimates yet introduced substantial cross-study heterogeneity, implying effects are population-specific rather than universal. Primary-prevention RCTs report neutral outcomes. The landmark VITAL trial randomised 25 871 healthy adults; daily 1-g marine n-3 fatty-acid supplementation yielded no primary-prevention benefit against major cardiovascular endpoints or invasive-cancer (Manson *et al.*, 2019a). Similarly, the ASCEND trial demonstrated no cardiovascular-event risk-reduction from omega-3 supplements among type-2-diabetes patients at moderate-to-high cardiovascular risk (Bowman *et al.*, 2018). Aung *et al.* (2018) ^[1, 5] meta-analysis of 10 trials (77 917 subjects) likewise detected no significant protection for coronary events, stroke or cardiovascular-mortality.

Disparate trial-outcomes largely originate from REDUCE-IT trial characteristics. REDUCE-IT recruited 8179 statins-treated patients with persistent hypertriglyceridaemia (135-499 mg/dL); high-dose (4-g daily) purified-EPA reduced major-adverse-cardiovascular-event relative-risk by 25 % (Bhatt *et al.*, 2019) ^[4]. Hence, cardiovascular-protection from omega-3 supplements manifest predominantly among patients with marked hypertriglyceridaemia and selected high-risk patients with established cardiovascular-disease. Routine supplementation offers no proven cardiovascular advantage for normolipidaemic healthy individuals. Safety considerations include elevated atrial-fibrillation risk associated with high-dose omega-3 exposure (Gencer *et al.*, 2021) ^[9]. Fish-oil is consequently not a universal cardioprotective panacea. High-purity high-dose EPA formulations deliver tangible clinical value for severe hypertriglyceridaemia; average-risk healthy people gain no benefit from routine long-term use. Consumers ought to avoid marketing-driven indiscriminate supplementation and make decisions guided by personal lipid-profiles and clinician counsel.

2. Vitamin-D

Beyond canonical calcium-phosphorus homeostasis and skeletal-health functions, vitamin-D has been hypothesised to modulate immunity, tumour-suppression and cardiovascular physiology, generating popular perceptions as a “universal vitamin”. High-quality research identifies a clear threshold-effect: supplementation confers benefits chiefly for vitamin-D-deficient persons; additional supplementation produces no incremental health-gain for vitamin-D-replete individuals and may incur hazards. Paediatric skeletal-health benefits are well-established.

Al-Shammari (2025) systematic-review reported vitamin-D3 supplementation (200-2000 IU daily, median 800 IU) increased paediatric lumbar-spine bone-mineral-density by 4.2 % (95 % CI 3.7-4.7 %), effects most pronounced in children aged 6-12 years and baseline vitamin-D-deficient subjects (serum-25-hydroxy-vitamin-D < 12 ng/mL). Prophylactic 400-1000 IU daily supplementation reduced rickets incidence by approximately 52 %. IPD-MA by Wu *et al.* (2023) confirmed bone-density improvements among deficient children-adolescents, with negligible effects for vitamin-D-sufficient youth.

For adult chronic-disease primary-prevention, VITAL demonstrated that 2000-IU daily vitamin-D3 failed to lower invasive-cancer or major-cardiovascular-event incidence among healthy adults (Manson *et al.*, 2019b) ^[11]. USPSTF evidence summaries concluded routine combined vitamin-D-calcium supplementation yields minimal fracture-prevention value for community-dwelling healthy adults and cannot be universally recommended (O'Connor *et al.*, 2022) ^[18]. Consistent evidence supports threshold-dependence:

serum-25-hydroxy-vitamin-D < 20 ng/mL defines deficiency wherein supplementation delivers definite skeletal-health advantages. Concentrations above 20 ng/mL gain no further benefit from extra supplementation; excessive intake raises nephrolithiasis and vascular-calcification risk. An important exception exists for periconceptional folate supplementation for fetal neural-tube-defect prevention, applicable for all pregnancy-planning women. Most other vitamin-mineral supplements obey the principle: supplement upon documented deficiency; replete individuals obtain no additional benefit. Best-practice workflow includes baseline serum-25-hydroxy-vitamin-D laboratory testing. Supplement only upon confirmed deficiency under professional guidance with subsequent re-assessment. Replete individuals maintain status via sensible sun-exposure plus dietary sources; unscreened long-term supplementation wastes resources and carries avoidable risk.

3. Probiotics

Probiotics represent one of the fastest-growing supplement-market segments, spanning fermented-dairy foods, powders and capsules, marketed for gut-microbiome modulation, allergy mitigation, immune-enhancement and weight-loss. A critical property frequently overlooked by consumers is strain-specificity: health-outcomes are strictly strain-dependent. Different strains belonging to identical species may exhibit entirely dissimilar physiological activities, analogous to distinct dog-breeds possessing divergent functional aptitudes. Maslennikov *et al.* (2026) ^[16] published a strain-stratified systematic-review-and-meta-analysis in *Journal of Clinical Medicine* evaluating probiotics for irritable-bowel-syndrome (IBS). Thirty-two randomised-placebo-controlled trials covering ten distinct strains were analysed. *Bifidobacterium longum* 35624, *Lactobacillus rhamnosus* GG, *Lactiplantibacillus plantarum* 299v, *Saccharomyces cerevisiae* CNCM I-3856 and *Bacillus coagulans* Unique IS2 significantly ameliorated core IBS symptoms. By contrast, *Escherichia coli* Nissle 1917, *Lactobacillus gasseri* BNR17 and *Lactobacillus casei* Shirota demonstrated no measurable therapeutic impact. These results corroborate earlier pivotal RCT work

(Whorwell *et al.*, 2006) ^[26] and meta-analyses (Goodoory *et al.*, 2023) ^[10]. Indiscriminate multi-strain-product purchasing may yield limited efficacy or even disrupt stable commensal gut-microbiota. Clinical decision-making must transition from generic “probiotic” category-thinking towards precise “specific-strain-to-specific-indication” matching. Product-selection should prioritise explicit strain-identifiers with supporting clinical-trial evidence rather than mere total-colony-forming-unit counts or species-level listings. Probiotic science continues rapid evolution; strain-specificity remains the cardinal guiding principle.

4. Multivitamins

Multivitamins rank among the world's highest-volume supplements, widely perceived as innocuous everyday-insurance filling dietary nutrient-gaps for disease-prevention. USPSTF-commissioned large-scale systematic-review furnishes authoritative counter-evidence (O'Connor *et al.*, 2022) ^[18]. This synthesis integrated 84 high-quality studies (>700 000 healthy adults). Pooled analysis of nine RCTs (n = 51 945) found multivitamin-use unrelated to statistically-significant all-cause-mortality alteration; no cardiovascular-disease-prevention signal was detected. A statistically-significant yet clinically-minuscule cancer-incidence reduction was observed (OR 0.93, 95 % CI 0.87-0.99), corresponding to absolute-risk differences merely 0.2-1.2 % (2-12 fewer cancer-cases per 1000 long-term users). Additional large-scale RCTs including COSMOS (Sesso *et al.*, 2022) ^[22] and Physicians'-Health-Study-II (Gaziano *et al.*, 2012) ^[8] consistently demonstrated multivitamins confer no meaningful primary-prevention benefit for chronic-disease or longevity among generally-healthy adults. Crucially, the review confirmed documented harms from certain supplement-components: β -carotene increases lung-cancer risk among smokers; routine vitamin-E supplementation elevates haemorrhagic-stroke risk without net clinical benefit. Consequently, USPSTF formally recommends against β -carotene or vitamin-E supplementation for cardiovascular-disease or cancer prevention among community-dwelling healthy adults. Adequate vitamin-mineral intake can ordinarily be achieved through diets containing fruits-vegetables, whole-grains, eggs, dairy and meat. Human bodies maintain nutrient reserves; short-term sub-optimal intake does not readily precipitate deficiency. Specific subgroups including severely-restricted-diet individuals, older-adults and malabsorption-syndrome patients may legitimately require targeted supplementation. For average-healthy-populations, routine multivitamin-supplementation delivers minimal value, wastes expenditure and is not risk-free. Prioritising balanced dietary patterns surpasses dependence upon pills.

5. Multivitamins and Cognitive Function

Population ageing heightens public concern for cognitive-decline and dementia-prevention, fuelling multivitamin-supplement utilisation among older-adults seeking neuroprotection. The COSMOS trial-programme generated rigorous RCT-level evidence. COSMOS-Web (Yeung *et al.*, 2023) ^[28] randomised 3562 older-adult participants receiving three-year annual web-based neuropsychological assessment. Multivitamin supplementation produced small improvements in one-year

immediate-recall memory, approximating reversal of 3.1 years of age-associated-memory-decline; no significant changes emerged for object-recognition or executive-function secondary-outcomes. COSMOS-Mind (Baker *et al.*, 2023) ^[2] telephonically assessed 2262 older-adults across three-years, detecting marginally-statistically-significant slowing of cognitive-ageing. A pooled meta-analysis synthesising three COSMOS cognitive-sub-studies yielded pooled effect-size 0.07 standard-deviations (95 % CI 0.03-0.11), corresponding to roughly two-years' theoretical cognitive-ageing delay (Vyas *et al.*, 2024) ^[29].

This effect size is clinically trivial and detectable only at a population-statistical level, with negligible perceptible impact on individual subjects; benefits are largely restricted to immediate memory domains without meaningful influence on executive function, language, or orientation. Furthermore, the study cohorts exhibited relatively high socioeconomic and educational status, potentially limiting generalizability. In contrast, well-validated cognitive health interventions—encompassing regular physical activity, blood pressure control, a Mediterranean-pattern diet, sufficient sleep, social engagement, and cognitively stimulating activities—produce substantially more robust global health benefits. Allocating resources to minimally effective multivitamins as neglecting proven modifiable risk factors represents a misplaced priority. Multivitamins confer only marginal potential cognitive benefits, even with prolonged intake, and should never constitute a primary neuroprotective strategy for older adults. Healthy lifestyle optimization and vascular risk factor control remain paramount.

Evidence-Based Evaluation of Health-Preserving Interventions

Evidence-bases across wellness domains are complex and heterogeneous; contradictory study-outcomes frequently confuse lay-persons and front-line clinicians. This section derives actionable general appraisal principles and discusses translation of scientific-evidence into clinical and public-health practice.

1. Five Appraisal Principles

Principle 1: Prioritise randomised-controlled-trial evidence and evaluate methodological-rigour.

RCTs represent the gold-standard for causal-inference, outranking anecdotal-reports, case-series, animal-studies and *in-vitro* experiments. Any health-claim unsupported by high-quality RCTs warrants scepticism. Nevertheless, RCT quality varies widely: assess random-sequence-generation, allocation-concealment, blinding strategies, comparator-group design and objective-outcome-measurement. Industry-funded trials are predisposed towards positive-outcome bias as exemplified by oral-collagen research (Myung & Park, 2025) ^[17]. Even RCT publications require scrutiny of independence and conflicts-of-interest rather than uncritical acceptance of “RCT-proven” marketing language.

Principle 2: Examine sample-size and multi-centre study-design.

Small-sample investigations are vulnerable to random-error and false-positive-findings with unstable conclusions. Large-sample multi-centre trials feature superior

statistical-power, result-reproducibility and external-validity. Weight evidence accordingly. Early small observational-studies suggested fish-oil cardiovascular-benefits; subsequent large-scale RCTs yielded neutral-primary-prevention results. Meta-analyses incorporating >120 000 participants and mega-trials such as VITAL furnish more reliable effect-estimates than limited pilot-work.

Principle 3: Evaluate journal-publication standing.

Journal impact-factor does not definitively validate individual-manuscript quality. Nonetheless, high-profile general-medicine and specialty-journals enforce stringent peer-review raising average methodological-standards. Landmark works published in *JAMA*, *NEJM*, *Lancet* carry high credibility, whereas predatory-journals frequently contain methodologically-flawed research. Where feasible, prioritise evidence reported within reputable peer-review outlets.

Principle 4: Rigorously inspect conflicts-of-interest and funding-sources.

Industry-sponsored studies consistently demonstrate higher odds of reporting sponsor-favourable conclusions, representing pervasive publication bias within supplement-and-pharmaceutical-research. Scrutinise funding disclosures for commercially-promoted products (collagen, edible-bird's-nest, chicken-essence). Positive-findings originating exclusively from manufacturer-funded research, unrepeated by independent investigations, deserve heightened scepticism.

Principle 5: Distinguish therapeutic versus preventive effects and differentiate special-population versus general-population applicability.

Marketing frequently extrapolates therapeutic benefits observed within specific patient-subgroups to universal preventive claims for all consumers. Most supplement-effects exhibit conditional population-dependency. Vitamin-D benefits hinge upon baseline circulating-concentration; probiotic-efficacy is strain-indication-coupled; fish-oil cardiovascular-gains largely apply to hypertriglyceridaemic subgroups. Avoid oversimplified labelling of interventions as universally “effective” or “ineffective”. Clarify target-populations, contextual conditions and magnitude of measurable effects. This five-principle framework supports rational appraisal amid overwhelming wellness-information landscapes and defends against misinformation and pseudoscience.

2. Translating Evidence into Practice

Scientific-evidence alone does not automatically reshape clinical-behaviour or public-health outcomes. Successful translation requires institutional-process-reform and multi-tiered educational-effort. First, shift supplement guidance away from “universal-supplementation” towards “targeted-supplementation”. Commercial-marketing often promotes “one-size-fits-all” supplementation paradigms. Empirical evidence demonstrates nearly all supplements possess well-defined boundaries of applicability. Clinical-advising and public-health messaging ought to abandon mass-supplementation narratives and advance precision-oriented targeted strategies: e.g. vitamin-D only for biochemically-confirmed deficiency; probiotic

prescriptions matching precise strain-indication-pairs instead of generic multi-strain-blends. Targeted-intervention optimises resource-allocation, conserving personal-societal expenditure and mitigating avoidable supplement-related-risk.

Second, implement biomarker-testing-guided supplementation-decision workflows. Targeted-intervention necessitates objective laboratory assessment prior to initiating long-term-supplementation: measure serum-25-hydroxy-vitamin-D for vitamin-D considerations; full lipid-panel before fish-oil commencement; characterise gastrointestinal-symptom phenotypes to inform probiotic-strain-selection. Reject “supplement-just-in-case” empiricism. Not every intervention demands complex laboratory-testing; individuals with evident dietary-imbalance ought to prioritise dietary-adjustment before supplement-use. Long-term high-dose-supplementation, however, should ideally rest upon baseline-testing plus periodic re-evaluation. Third, elevate public evidence-based-health-literacy. Consumers ultimately make personal wellness-decisions. Without foundational EBM-literacy, populations remain susceptible to commercial-misinformation. Public-health education should teach core concepts: why RCT evidence outweighs anecdotal-experience; how funding-bias distorts study-outcomes; how to distinguish subgroup-specific-therapeutic-benefits from broad-population-preventive-claims. Improved citizen-level critical-appraisal undermines pseudoscientific-marketing viability. These three-interlinked pillars complete the evidence-to-practice translation pathway, realising EBM’s practical public-health value.

Discussion

This narrative systematic-review evaluated TCM wellness-modalities, traditional nourishing-foods and modern-dietary-supplements, proposing appraisal-principles and practice-recommendations. Study limitations ought to be acknowledged for appropriate result-interpretation and guiding future-research. This manuscript constitutes a narrative-systematic review without prospective trial registration or formal quantitative GRADE evidence-certainty grading under full PRISMA registration protocols. Although our search strategies aimed for comprehensiveness, unpublished grey literature may remain uncaptured, introducing potential selection bias. Nevertheless, core high-impact representative studies were incorporated to ensure robust overall conclusions. Furthermore, clinical trials evaluating traditional wellness modalities face inherent methodological challenges. Acupuncture trials encounter practitioner-blinding barriers, and the physiological activity of sham-acupuncture comparators remains debated, which may bias effect-size estimation. Multi-herb compound formulations suffer from compositional complexity and batch variability, limiting standardisation and cross-study comparability. Additionally, nourishing-food trials are frequently small-scale and industry-funded, with limited independent high-quality data. These domain-wide constraints inherently restrict evidence certainty.

Geographically, most primary studies derive from East Asian or Western populations, meaning extrapolation to ethnic Chinese populations warrants caution. Differences in genetic background, habitual diet, lifestyle patterns, and the gut microbiome can modify responses to botanicals and

nutritional supplements—as exemplified by observed subgroup trends within berberine meta-analyses. Consequently, local ethnic Chinese population-specific research is required to refine effect-magnitude estimates and clinical applicability. Finally, wellness and nutrition science evolve rapidly, with emerging research occasionally revising prior consensus. Probiotic strain repositories expand continuously, methodological controversies surrounding oral collagen persist, and optimal thresholds for vitamin D remain under refinement. The conclusions presented herein reflect the best available evidence as of October 2026^[12] and will require iterative updating as new data accumulates.

From health-economics perspectives, population-level costs stemming from indiscriminate-supplementation merit attention. Although individual-supplement-expense may appear modest, aggregate-societal expenditure across large consumer-populations becomes substantial. Additional costs include adverse-event-management and opportunity-cost: financial, temporal and cognitive resources directed towards marginal-efficacy supplements displace investment into far-higher-value preventive-interventions: physical-activity promotion, tobacco-cessation, hypertension-control and healthy-diet-advocacy. Resource-allocation prioritising these evidence-proven public-health-measures yields superior population-health-gain compared with mass-multivitamin-supplementation. Wellness-choices carry not merely individual-health-consequences but also public-health-resource-allocation ramifications. Therefore, public-health policies should revisit the stringency of regulatory oversight over advertising and health-related claims for dietary supplements. At present, regulatory frameworks governing health claims for dietary supplements remain overly permissive in many countries, resulting in rampant exaggerated and deceptive assertions that mislead consumers. All purported health-benefit claims ought to be required to rest upon high-quality human randomised controlled trials; exaggerated statements and misleading marketing practices should be strictly prohibited. Meanwhile, a testing-driven supplementation decision-making process overseen by medical professionals should be established, guiding the public away from indiscriminate wellness-seeking toward targeted, precision-oriented supplementation. Oversight delivered through the healthcare system ensures that supplements are appropriately administered to those with genuine clinical needs, while the majority of healthy individuals revert to foundational healthy-lifestyle behaviours. Only in this manner can limited healthcare and personal health-related resources be optimally allocated to maximise population-level public-health gains.

Conclusions

Drawing upon evidence-based medicine (EBM) frameworks, this systematic review synthesised empirical evidence across traditional Chinese medicine (TCM) health-preserving modalities, traditional nourishing foods, and modern dietary supplements, while establishing a standardised appraisal logic. Four principal conclusions emerge from this evaluation: First, TCM wellness interventions exhibit heterogeneous evidence grades and ought not to be uniformly dismissed or endorsed. Acupuncture demonstrates stable, high-grade evidence and a favourable safety profile for chronic pain management, supported by neuroimaging mechanistic data. Berberine delivers moderate-grade evidence for glycaemic modulation

as a lifestyle intervention adjuvant (OpenAI, 2026). Similarly, curcumin yields adjuvant anti-inflammatory potential for inflammatory diseases, though it remains hampered by poor oral bioavailability that awaits innovative formulation validation. Conversely, most compound herbal diets, constitution-pattern conditioning, and seasonal tonification lack high-quality human trial evidence while carrying potential hepatic-renal burdens and drug-interaction hazards; consequently, unsupervised long-term self-administration is discouraged. Second, the purported benefits of traditional nourishing foods are frequently overstated by marketing narratives, generally offering poor cost-effectiveness. Clinical evidence for oral collagen supplements is marred by methodological controversy and industry-funding bias, with high-quality independent meta-analyses failing to confirm structural anti-ageing skin effects. The nutritional value of edible bird's nest is inferior to inexpensive complete protein sources, and human clinical validation remains limited; its premium pricing arises predominantly from scarcity and cultural symbolism rather than unique nutritional potency. While concentrated chicken essence furnishes preliminary exercise-recovery evidence, it is constrained by small sample sizes and limited external validity, and its core nutritional components can be affordably obtained from an ordinary balanced diet. Third, modern dietary supplements manifest pronounced population-specific targeted benefits and are by no means universal panaceas. The cardiovascular protection of fish oil is largely confined to patients with severe hypertriglyceridaemia and selected high cardiovascular risk patients; routine supplementation offers no advantage for normolipidaemic healthy populations, and high doses may elevate the risk of atrial fibrillation. Vitamin D exhibits threshold dependence, with tangible benefits restricted to biochemically deficient individuals. Furthermore, therapeutic effects of probiotics are strictly strain-specific, meaning generic multi-strain products may be ineffective or even perturb commensal gut microbiota. Routine multivitamin supplementation delivers negligible primary prevention benefits for chronic disease among generally healthy adults, whereas beta-carotene and vitamin E supplementation carry documented harms within certain subgroups and cannot be universally recommended (Lu, 2026). Fourth, five core appraisal principles guide evidence-based wellness evaluation: prioritising well-conducted randomized controlled trial (RCT) evidence with rigorous methodological quality assessment; valuing large-sample, multicentre study designs; favouring high-impact, peer-reviewed journal publications; rigorously scrutinising funding sources and conflicts of interest; and carefully distinguishing therapeutic versus preventive effects while separating special subgroup findings from general population claims. Applying these principles enables rational decision-making amidst abundant and often conflicting wellness information. Future-research priorities include: generating ethnic-Chinese-population-specific empirical-data for locally-popular wellness-interventions; developing standardised clinical-trial-protocols for dietary-supplements, strengthening oversight for industry-sponsored-research and mandating conflict-of-interest-disclosure requirements; building biomarker-guided personalised-supplementation-decision-models shifting practice from experiential towards precision-oriented-paradigms; exploring integration of EBM-health-literacy

national-public-health-education curricula to mitigate resource-waste and health-hazards stemming from misinformed wellness-consumption. Wellness-practice ought to return to empirical-evidence and foundational-healthy-lifestyle principles, maximising value for individual-consumers and optimising public-health-resource-allocation.

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