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Review Article

A Comparative Review of Modern Pharmacy and Jamu through the Djampi Oesodo Triad Philosophy

Fajar Prasetya[1,3*], Lusy Noviani[2*], Hadi Kuncoro[1], Niken Indriyanti[1], Daniel Tjen[3], Jaya Suprana[3]

[1]Faculty of Pharmacy, University of Mulawarman, Samarinda, Indonesia
[2]Atma Jaya Teaching & Research Hospital, Jakarta, Indonesia
[3]Indonesia Jamu Council, Jakarta, Indonesia

*Email Correspondence: fajarprasetya@farmasi.unmul.ac.id

Abstract

Modern pharmaceutical science is predominantly grounded in a reductionist paradigm in which therapeutic efficacy is explained by the interaction of chemical matter with biological targets, governed by binding free energy and conformational dynamics at the molecular level. Indonesian Jamu tradition conceptualized here through the framework of *Jamulogi* and the ancestral philosophy of *Djampi Oesodo* approaches healing as an integrated process involving ***kesadaran*** (consciousness), ***energi*** (biophysical and embodied regulation), and ***materi*** (biochemical substances derived from plants, animals, and minerals). The analysis synthesizes evidence from molecular pharmacology, structural biology, placebo–nocebo neuroscience, systems and network pharmacology, ethnomedicine, archaeology, and environmental health. Modern pharmaceutical efficacy is examined through the lens of binding free energy (ΔG bind) and protein–ligand conformational landscapes, while Jamu is analysed as a multi-component, multi-target system whose effects are modulated by consciousness-mediated expectation, ritualized therapeutic context, embodied techniques, and ecological continuity. Neuroscientific evidence demonstrates that expectation and belief can modulate endogenous opioidergic, neuroendocrine, autonomic, and immune pathways, providing biological validation for the therapeutic role of consciousness emphasized in Djampi Oesodo. Concurrently, systems pharmacology and natural product research support the plausibility of Jamu's material domain as a network-level pharmacological intervention. The review argues that the apparent dichotomy between pharmacy and Jamu reflects differences in explanatory level rather than scientific incompatibility. By framing molecular binding energetics and systemic state regulation as complementary layers of therapeutic causality. This framework offers a coherent foundation for future research in ethnopharmacology, systems biology, integrative clinical trial design, and sustainable phytopharmaceutical innovation within Indonesia and beyond.

Keywords: Jamu, Djampie Oesodo, Triad Philosophy, Jamulogi, Modern pharmaceutical science

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1 Introduction

Modern pharmaceutical science is, at its core, a discipline of matter and measurable energetics. From medicinal chemistry to clinical pharmacology, the dominant explanatory engine is the idea that therapeutic action emerges when a defined chemical entity interacts with a defined biological target in a manner that is predictable at least probabilistically by thermodynamic and kinetic principles. The language of contemporary drug discovery is therefore saturated with concepts such as binding free energy (ΔG_bind), enthalpy–entropy compensation, conformational strain, solvation/desolvation penalties, residence time, and allostery. In this framing, "energy" is not a metaphor; it is a quantifiable property of molecular ensembles that can be estimated experimentally or computed with increasing precision [37], [13], [29], [31]. When combined with structural biology and molecular dynamics, such methods support the practical goal of modern medicinal chemistry: to design or optimize molecules that minimize ΔG bind for the intended target while controlling selectivity and pharmacokinetics [27-28].

Yet, parallel to this sophisticated matter-and-energy paradigm exists a long-standing global family of healing systems Traditional Chinese Medicine, Ayurveda, and many other ethnomedical traditions that interpret health and disease as emergent phenomena involving not only material substances but also context, meaning, mind, ritual, embodied technique, and ecological relationship. In Indonesia, the Jamu tradition is historically distinguished by its deeply embedded cultural logic: healing is not simply administered, but enacted through recipes, touch, breath, prayer/mantra, and communal practice a synthesis of what may be summarized as consciousness, energy, and matter. In the conceptual proposal known as Jamulogi, this synthesis is formalized through the triadic philosophy of Djampi Oesodo: *kesadaran* (consciousness), *energi* (biophysical and vibrational processes, including embodied modalities), and *materi* (biochemical substances) as the integrated basis of Nusantara healing. The aim is not to replace biomedical science but to articulate a culturally grounded integrative health science that can be investigated with contemporary methods while preserving the epistemic integrity of the tradition [16].

The scientific plausibility of including "consciousness" as a causal therapeutic dimension is no longer purely philosophical. Over the last decades, placebo–nocebo research has generated a robust body of evidence demonstrating that expectation, belief, and therapeutic meaning can modulate pain perception, autonomic output, endocrine responses, and immune signaling via identifiable neurobiological pathways. Placebo analgesia can recruit endogenous opioid systems and descending pain control circuitry [24], [39], [15], while nocebo hyperalgesia can be mediated by anxiety-related processes and neurochemical pathways such as cholecystokinin signaling [4], [12]. Such findings are highly relevant to Djampi Oesodo's *kesadaran* domain: they imply that the mind–meaning interface can be operationalized and tested, rather than treated as mere "suggestion" or confound.

In parallel, systems biology and network pharmacology are challenging the implicit assumption that "one drug–one target" is adequate for understanding complex diseases. Hopkins (2008) argued that network pharmacology would become a next paradigm in drug discovery, especially for polygenic, multifactorial conditions [21]. This shift is directly aligned with the reality of many Jamu preparations: they are multi-component mixtures containing numerous metabolites with potential to influence multiple pathways simultaneously. Natural products remain a central source of new drugs and lead structures, and modern reviews emphasize both their opportunity and their methodological challenges [2], [32]. The material domain of Jamulogi *materi* is therefore compatible with, and arguably demands, systems-level approaches that modern pharmacology is now beginning to normalize.

A further essential dimension of Jamulogi is ecological: *materi* is inseparable from biodiversity, sustainable harvesting, and traditional ecological knowledge. Without stable ecosystems and sustainable supply chains, the material basis of traditional healing cannot be preserved or reliably standardized.

Conservation and sustainable use of medicinal plants is widely recognized as a pressing issue, with threats including overharvesting and habitat degradation [10], [26]. For Indonesia specifically, prioritization frameworks for medicinal plant conservation have been proposed to guide policy and practice [8]. In Djampi Oesodo terms, ecological stewardship is not peripheral; it is a prerequisite for the continuity and reproducibility of *materi*, and thereby for the integrity of the entire triad.

This review therefore addresses a specific comparative question: How does the modern pharmaceutical paradigm—centered on chemical matter and the free energy of binding and conformation compare with a Jamulogi/Djampi Oesodo paradigm that integrates consciousness (psychic), energy (biophysical and embodied), and matter (multi-metabolite natural products from plants, animals, and minerals)? The review argues that these paradigms are not mutually exclusive; rather, they operate at different levels of explanation. Modern pharmacy is exceptionally strong in describing and manipulating molecular-level energetic landscapes, while Jamulogi proposes a broader causal frame that includes system-level energetic regulation and consciousness-mediated modulation, alongside material pharmacology. The central hypothesis advanced here is that a rigorous integrative model can be constructed in which:

1. Molecular ΔG_bind and conformational energetics describe material interactions;
2. Physiological state variables (autonomic, endocrine, immune regulation) describe systemic energetic context; and
3. Expectation/meaning/ritual variables describe consciousness-driven modulation that can shift systemic state and thereby alter the realized clinical expression of both pharmaceuticals and Jamu preparations [12], [15], [39].

The review is written in a manner intended to be useful for multiple audiences: pharmacologists and medicinal chemists seeking a rigorous conceptual mapping of Djampi Oesodo; ethnopharmacologists and integrative medicine researchers pursuing testable frameworks for complex interventions; and policymakers concerned with sustainability and evidence standards for traditional medicine integration. By comparing the paradigms through the shared language of energetics molecular free energy and systemic regulation the paper seeks to move beyond superficial "traditional vs modern" binaries toward a scientifically tractable synthesis.

2 Method

2.1 Review design

This manuscript is a narrative integrative review with systematic conceptual components, selected to address a multidisciplinary, theory-building question. A meta-analysis is inappropriate because the target is not a single clinical endpoint but rather the comparison and integration of mechanistic explanatory frameworks across molecular pharmacology, placebo/nocebo neuroscience, natural product systems pharmacology, conservation science, and comparative medicine.

2.2 Evidence domains

The review synthesizes evidence across six domains:

1. Binding free energy and rigorous computational methods in drug discovery, including statistically optimal analysis of multiple equilibrium states and alchemical free energy perspectives [13], [28], [29], [31], [37].
2. Conformational dynamics and energy landscapes in biomolecular recognition and protein function [7], [9], [11], [20], [34].
3. Placebo/nocebo neurobiology and the causal role of expectation and meaning in physiological outcomes, particularly pain modulation [4], [12], [15], [24], [19], [39].
4. Jamu rationalization and evidence-based integration, focusing on the transition from traditional usage toward phytopharmacological and clinical evidence standards [16], [30]
5. Natural products and multi-target pharmacology, including landmark syntheses of natural products as sources of new drugs and discussions of systems/network approaches relevant to multi-component interventions [2], [21], [25], [32].

6. Environmental, ecological, and conservation foundations for medicinal plant sustainability and the preservation of traditional ecological knowledge [6], [8], [10], [26].

2.3 Conceptual synthesis approach

The synthesis uses three complementary strategies:

1. Mechanistic level mapping: mapping Djampi Oesodo domains (consciousness, energy, matter) onto mechanistic levels in contemporary biomedicine (cognitive-affective modulation, systemic regulation, molecular interactions).
2. Comparative epistemology: identifying the assumptions and explanatory priorities of the two paradigms (reductionist materialism vs integrative systems). Systems alternatives to reductionism are considered explicitly [1].
3. Testability and research design implications: proposing measurable constructs and study designs capable of distinguishing and integrating contributions of consciousness, energy, and matter in therapeutic outcomes, in line with evidence transparency principles [14].

3 Result and Discussion

3.1 The modern pharmaceutical paradigm: matter plus binding–conformation free energy

3.1.1 Binding free energy as an explanatory and predictive construct

In modern medicinal chemistry, the notion of binding free energy is a foundational bridge between microscopic molecular interaction and macroscopic therapeutic effect. Conceptually, ΔG_bind expresses the change in Gibbs free energy associated with transferring a ligand from a reference state (typically solvated) into a bound complex with a protein. The relationship between ΔG and equilibrium association constants (K_a) gives direct interpretability: small changes in ΔG can produce large changes in occupancy. The statistical thermodynamic basis for such calculations has long been articulated, including careful attention to ensemble definitions and sampling [18]. Contemporary computational practice extends these foundations through rigorous methods and statistically optimal estimators such as MBAR [37], enabling relative binding free energy predictions that increasingly influence lead optimization strategies [13].

The maturation of free energy methods is partly a response to the limitations of docking scores and heuristic scoring functions. Where docking provides quick hypotheses about binding modes, rigorous free energy calculations aim to quantify energetic differences between analogs or binding poses, supporting more reliable decision-making. Perspectives emphasize both the power and practical constraints—force-field accuracy, sampling convergence, treatment of water networks, and computational cost [28-29]. Yet, drug discovery increasingly accepts that energetic rigor is worth the effort in high-value contexts, and recent reviews highlight continuous methodological improvements for industry adoption [31].

3.1.2 Conformational dynamics: recognition as ensemble selection

The pharmaceutical paradigm's energy language is not limited to ΔG_bind. It extends to conformational landscapes of both ligand and protein. Protein function is now widely understood as a property of dynamic ensembles, where biomolecular recognition can emerge through conformational selection or induced fit, or a combination thereof [7], [9]. The key implication is that therapeutic modulation may depend not only on whether a ligand binds, but on which conformational states it stabilizes thereby biasing downstream signaling, catalytic activity, or allosteric regulation.

Modern structural biology and dynamics studies have demonstrated that many proteins traverse large-scale open–closed transitions, with intrinsic energy landscapes that can be quantified and analyzed [11]. The practical relevance to pharmacy is profound: a drug may be "effective" not merely because it occupies a site, but because it reshapes the conformational ensemble of a target system to produce desired physiological outcomes. This is particularly salient for membrane proteins, where conformational landscapes determine gating, transport, and receptor signaling [20].

3.1.3 Strengths and characteristic blind spots

The modern paradigm's strengths include reproducibility (when well executed), mechanistic clarity, and scalable translational pathways. It excels when:

a. the disease mechanism can be linked to a specific target or pathway;
b. the pharmacokinetics are tractable;
c. and the intervention is sufficiently specific to isolate causal effect.

However, this paradigm has characteristic blind spots. By prioritizing target-bound energetics, it can underweight the role of system-level state and meaning/context in shaping outcomes. These factors are often treated as noise or confounds rather than causal variables. Yet clinical reality repeatedly indicates that context can change the magnitude and sometimes the direction of therapeutic response. Placebo/nocebo research makes this point unavoidably: expectation can modulate analgesia through identifiable neurobiology [15], [39] implying that a purely material account is incomplete for many real-world outcomes.

This observation does not invalidate molecular pharmacology; rather, it suggests that the modern paradigm is necessary but not always sufficient to explain the full variance of clinical response. That gap is precisely where integrative frameworks such as Jamulogi seek to contribute.

3.2 Jamulogi/Djampi Oesodo: consciousness–energy–matter as a coherent therapeutic triad

3.2.1 Jamulogi as an integrative health science proposal

Jamulogi proposes that Indonesian ancestral healing knowledge can be reframed as a comprehensive health science integrating philosophical, cultural, spiritual, environmental, and biomedical perspectives. Its core triad kesadaran, energi, materi is presented not as a symbolic slogan, but as an organizing framework for mechanistic inquiry. This is consistent with broader efforts to bridge traditional medical systems with evidence-based approaches without collapsing their conceptual integrity [30], [35].

The rationalization of Jamu has already been articulated in scientific terms: Indonesian traditional herbal medicine can be advanced toward rational phytopharmacological use by integrating quality control, pharmacological evidence, and clinical research [6]. Jamulogi extends this rationalization by insisting that "rationality" must include not only chemical standardization but also the causal contribution of consciousness and embodied modality domains that modern neuroscience increasingly supports [12], [15].

3.2.2 *Materi* : multi-component mixtures, systems pharmacology, and natural product opportunity

In Djampi Oesodo, *materi* is the domain most readily recognized by modern science: it includes the chemical constituents of plants, animals, and minerals. However, *materi* in Jamu typically does not present as a single isolated molecule; it is an ensemble of metabolites, often prepared through extraction and formulation practices that preserve complexity. Natural products research provides a strong foundation for taking this domain seriously: across multiple decades, analyses show that a substantial portion of new drugs are either natural products, derivatives, or inspired by them [32-33]. Contemporary reviews in high-impact venues continue to emphasize that natural products remain a central frontier for drug discovery, particularly when integrated with modern screening, structural biology, and computational methods [2].

The multi-component nature of Jamu pushes pharmacology toward systems and network approaches. Hopkins (2008) framed network pharmacology as a paradigm shift needed to address complex diseases [21]. For traditional medicines especially those with polyherbal formulations—network pharmacology approaches are increasingly discussed as practical ways to map compounds to targets and pathways, though methodological rigor remains critical [25].

At the compound-class level, flavonoids exemplify why a network view is often necessary: they interact with multiple pathways relevant to inflammation, oxidative stress, neurodegeneration, and metabolic regulation [23]. Specific therapeutic interest in neurological disease contexts has been examined through mechanistic reviews highlighting multi-target interactions [3], [17]. Systems pharmacology

strategies have been proposed to identify active ingredients among flavonoids and to relate them to network-level effects [40].

In Jamulogi terms, *materi* is therefore not merely "herbal content," but a system of chemical possibilities whose therapeutic expression depends on mixture composition, preparation method, dosing, and the biological state of the patient.

3.2.3 *Kesadaran* : the neurobiology of expectation, belief, intention, and meaning

The distinguishing move of Djampi Oesodo is to treat *kesadaran* as a causal therapeutic domain. Modern placebo/nocebo science is the most direct biomedical correlate. The foundational demonstration that placebo can reduce pain dates to clinical and experimental work showing that placebo analgesia can be reversed by naloxone in some contexts, suggesting endogenous opioid mediation [24].Subsequent work indicated that placebo and naloxone can alter post-surgical pain through different mechanisms, emphasizing complexity and heterogeneity of placebo pathways [19]. Neuroimaging studies demonstrated that placebo could alter brain responses during anticipation and experience of pain [39]. Later, it was shown that placebo analgesia can engage the descending pain control system with opioidergic mechanisms [15]. Together, these findings provide a mechanistic basis for considering expectation and meaning as part of t herapeutic causality.

Nocebo research complements this by showing that negative expectation can worsen outcomes. Benedetti et al. (1997) demonstrated blockade of nocebo hyperalgesia by a cholecystokinin antagonist, indicating that neurochemical pathways beyond opioids mediate expectation-driven effects [4]. Colloca and Benedetti (2005) synthesized these ideas, asking whether mind is "as real as matter" in pain therapy an argument highly resonant with Jamulogi's insistence that consciousness is not epiphenomenal [4], [12].

If *kesadaran* can modulate endogenous analgesic systems, autonomic tone, and neuroimmune responses, then ritual, prayer/mantra, therapeutic narratives, and healer–patient relationships—features historically present in many Nusantara healing practices—may exert effects through measurable pathways. In other words, Djampi Oesodo's *kesadaran* can be translated into experimental constructs: expectancy manipulations, meaning-enhancement interventions, and relational-context variables, all within ethical and scientifically rigorous frameworks [12].

3.2.4 Energi: embodied techniques and systemic regulation as mediating interface

The second distinctive domain of Djampi Oesodo is *energi*, which can be interpreted as the mediating interface between consciousness and matter. In a modern biophysical framing, *energi* may correspond to **system-level regulatory processes**: autonomic balance, neuroendocrine state, immune activation, inflammatory tone, and stress physiology. While Jamulogi also allows for "vibrational" interpretations, the most productive translational move is to define *energi* through measurable variables that bridge subjective experience and molecular response.

Embodied techniques such as massage, bathing rituals, breath regulation, and sound/mantra are plausible modulators of autonomic and affective state. While this manuscript does not review a specific body of massage or breathwork RCTs in detail, the conceptual logic aligns strongly with placebo research: contextual and embodied interventions can shape expectation and reduce anxiety, thereby shifting descending pain control, inflammatory signaling, and related outcomes [12], [15]. In Djampi Oesodo, *energi* is therefore not "mystical filler," but an organizing concept for the state-dependent physiology that mediates between mind and molecules.

3.3 Energetics as a shared language: molecular free energy versus systemic "state energy"

A central claim of this review is that the apparent conflict between modern pharmacy and Jamulogi can be reduced by recognizing that they emphasize **different levels of energetics**.

3.3.1 Molecular free energy: ΔG_bind and conformational landscapes

Modern pharmacy excels in describing molecular energetics. ΔG_bind calculations and conformational landscape analysis capture how likely it is that a particular molecular complex forms and

persists [18], [28], [37]. Conformational ensemble theory explains why binding and function depend on dynamic states rather than static structures [7], [9].

3.3.2 Systemic energetics: regulatory states that shape responsiveness

Jamulogi directs attention to energetics at the level of whole-organism regulation: "state" variables that may be conceptualized as energetic constraints on physiological responsiveness. For example, in pain, the same nociceptive input can be experienced as more or less painful depending on expectation and emotional state, because descending modulation and endogenous analgesic systems change the "gain" of the pain network [15], [39]. Nocebo hyperalgesia illustrates that negative expectation can raise the gain through neurochemical pathways [4].

These are not contradictions. They suggest a layered model: molecular energetics explains ligand–target interactions, while systemic energetics explains how the organism's current state transforms those interactions into subjective and clinical outcomes.

3.3.3 An integrative proposition

The integrative proposition is therefore:

a. Material pharmacology remains valid and is essential for reproducibility and safety.
b. Consciousness and energy domains can be integrated as modulators that shift systemic state, thereby changing the realized effect of material pharmacology.

This proposition aligns with systems thinking critiques of reductionism: complex health outcomes may not be captured by linear target-based explanations alone [1]. It also aligns with the practical observation that patients are not passive biochemical reactors; they are agents embedded in meaning systems and environments.

3.4 Network pharmacology as the methodological bridge for multi-component Jamu

3.4.1 Why network pharmacology matters for Jamu

If Jamu preparations contain many compounds, then single-target models risk missing emergent properties such as synergy, antagonism, buffering, and pathway-level redundancy. Hopkins (2008) argued that network pharmacology better matches the complexity of biological systems and diseases [21]. For traditional medicines, reviews increasingly discuss network pharmacology as a way to map multi-component interventions to networks of targets and pathways [25].

However, network pharmacology must be applied carefully. Without rigorous compound identification, pharmacokinetic considerations, and experimental validation, network maps can become speculative. Here, the rationalization agenda for Jamu becomes central: quality control and evidence-based approaches are necessary to prevent "network pharmacology" from becoming a decorative narrative [16], [30].

3.4.2 Integrating modern free energy methods with network pharmacology

A future-forward Jamulogi research program could integrate free energy calculations into network pharmacology in a disciplined manner:

1. identify major constituents and plausible targets;
2. use docking and dynamics to propose binding modes;
3. apply relative binding free energy calculations for prioritized ligand–target pairs [13], [29];
4. validate experimentally;
5. integrate results into network models.

This approach keeps the rigor of modern pharmaceutical energetics while respecting the multi-target nature of Jamu.

3.5 Ecological and cultural foundations: sustaining *materi* and preserving knowledge integrity

A defining feature of Jamulogi is its insistence that healing is ecologically embedded. If *materi* depends on biodiversity, then conservation is directly connected to therapeutic continuity. Global reviews

emphasize that conservation and sustainable use of medicinal plants remains a major challenge [10]. Overharvesting is repeatedly identified as a leading conservation issue, with implications not only for biodiversity but for the continuity of ethnomedical practices [26]. Traditional ecological knowledge is increasingly recognized as an adaptive management resource, relevant for sustainability and resilience [6].

For Indonesia, prioritization of medicinal plants for conservation has been proposed to guide resource allocation and strategy development [8]. Such work is essential for Jamulogi because reproducible phytopharmacology requires stable access to consistent material sources. Standardization becomes impossible if plant populations are degraded or substituted unpredictably due to scarcity. Thus, conservation is not merely a moral add-on; it is part of the scientific infrastructure for evidence-based Jamu and any future phytopharmaceutical innovation pipeline.

3.6 Research design implications: testing Jamulogi without collapsing holism

A recurring problem in integrative medicine research is the tension between experimental control and ecological validity. Jamulogi complicates this further by explicitly treating consciousness and energy as causal variables. The question becomes: How can we design studies that test the triadic model without stripping it of its defining features?

3.6.1 Standardization of *materi* as a prerequisite

First, the material domain must be standardized to meet evidence-based expectations. Elfahmi et al. (2014) emphasize rational phytopharmacological development for Jamu [16], which implies:

a. Chemical fingerprinting, marker compounds, batch-to-batch consistency;
b. Control of contamination/adulteration;
c. Pharmacokinetic plausibility;
d. and dose rationalization.

This is also consistent with broader calls to integrate herbal medicine into evidence-based practice [30]. Without material standardization, any attempt to evaluate consciousness or energy contributions becomes confounded.

3.6.2 Factorial and expectancy-modulation designs for *kesadaran*

Second, *kesadaran* can be tested through designs that manipulate expectation and meaning. Placebo/nocebo research provides templates: expectation can be adjusted through information framing, ritual enhancement, clinician communication, and context cues, with measurable effects on pain and physiology [12], [39]. Ethically, such designs must avoid deception where possible and adhere to modern transparency standards. The existence of open-label placebo paradigms (not reviewed here) suggests feasibility, but regardless of approach, the key is that *kesadaran* can be operationalized and tested as an independent variable.

3.6.3 Biomarkers and physiological measures for *energi*

Third, *energi* can be operationalized through physiological state measures: autonomic output, stress hormones, inflammatory markers, and potentially neuroimaging in select contexts. While this review does not list specific HRV/cortisol trials, the conceptual grounding is supported by the recognized physiological pathways through which expectation modulates pain and stress response [4], [15]. The aim is to replace vague claims with measurable mediators.

3.6.4 Integrating evidence and preserving transparency

Finally, integrative research must adhere to transparency principles to avoid publication bias and selective reporting. Calls to restore invisible and abandoned trials highlight the ethical and scientific necessity of publishing results and preserving trial integrity [14]. Jamulogi research, precisely because it may draw public interest, should set a high bar for preregistration, open methods, and reproducible reporting.

4. Conclusion

This review demonstrates that modern pharmacy and the Jamu tradition represent two distinct but fundamentally compatible therapeutic paradigms that operate at different explanatory levels of the healing process. Contemporary pharmaceutical science excels in elucidating and manipulating material interactions, particularly through the rigorous characterization of molecular binding free energy, conformational dynamics, and structure–activity relationships. These approaches provide a powerful and indispensable foundation for drug discovery, standardization, and regulatory evaluation. However, by focusing primarily on molecular energetics, conventional pharmacy often underrepresents the contributions of systemic physiological state and therapeutic meaning, which are increasingly recognized as critical determinants of clinical outcomes.

In contrast, Jamu conceptualized through the Jamulogi framework and the Djampi Oesodo triad of kesadaran (consciousness), energi (biophysical and embodied regulation), and materi (natural substances) offers a holistic model in which healing emerges from the dynamic interaction of these three domains. Archaeological, cultural, and philological evidence indicates that such integrative practice has characterized Nusantara healing traditions for centuries, while contemporary neuroscientific and psychoneuroimmunological research now provides biological validation for the therapeutic role of consciousness and context. Expectation, belief, ritual, and practitioner–patient interaction is shown to modulate endogenous neurochemical, autonomic, and immune pathways, thereby shaping how material interventions whether synthetic drugs or complex herbal preparations are ultimately experienced and expressed clinically.

Importantly, this review argues that the perceived opposition between pharmacy and Jamu is not a conflict between science and tradition, but rather a consequence of reductionist versus systems-level perspectives. When molecular binding energetics are situated within broader networks of physiological regulation and consciousness-mediated modulation, a more comprehensive and realistic model of therapeutics emerges. Advances in systems and network pharmacology, natural product research, and integrative clinical trial design provide practical methodological bridges that can translate Jamulogi into testable, reproducible, and regulatory-relevant research programs.

Finally, the environmental and cultural dimensions of Jamu underscore that therapeutic efficacy cannot be separated from biodiversity conservation, sustainable resource management, and the preservation of traditional ecological knowledge. In this sense, Jamulogi extends the scope of pharmacy beyond the laboratory and clinic into ecological and societal domains that are increasingly central to global health. By integrating molecular rigor with systemic regulation, consciousness, and sustainability, Jamulogi offers a culturally grounded and scientifically plausible framework for the future of integrative medicine and phytopharmaceutical innovation positioning Jamu not as an alternative to modern pharmacy, but as its complementary and contextual extension.

5. Declarations

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5.2 Author contributions

The names of the authors listed in this journal contributed to this research.

5.3 Ethics

This research does not require a code of ethics so it does not have a code of ethics.

5.4 Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper. No financial or non-financial interests, personal relationships, or affiliations have influenced the content, analysis, or conclusions presented in this research. All sources of funding, if any, are acknowledged transparently, and the research was conducted independently and without any commercial or institutional bias.

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