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Review Article

Integrative Perspectives on Hypertension Management: A Comparative Analysis of Unani and Allopathic Systems

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ABSTRACT

Background: Hypertension remains a major global health concern, affecting over 1.4 billion individuals worldwide and contributing significantly to cardiovascular morbidity and mortality. Allopathic medicine offers evidence-based diagnostic tools and pharmacological interventions for rapid blood pressure control, whereas Unani medicine emphasizes Mizaj (temperamental) balance, lifestyle modification, and natural therapeutics. Understanding the comparative philosophies of both systems can guide integrative, patient-centered hypertension management.
Objective: To critically compare the principles, diagnostic approaches, therapeutic modalities, and preventive strategies of hypertension management in Unani and allopathic systems, and to identify potential integrative pathways for improved outcomes.
Methods: A narrative review of classical Unani texts (Al-Qanun fi'l-Tibb, Al-Hawi fi'l-Tibb, Kamil al-Sana'a al-Tibbiyya) and contemporary literature from PubMed, Scopus, AYUSH, and WHO databases (2020-2025) was conducted. Around 61 peer-reviewed studies, clinical trials, and guidelines were analysed, focusing on pathophysiology, diagnosis, therapy, and prevention.
Results: Allopathy emphasizes standardized diagnosis and pharmacological management using ACE inhibitors, beta-blockers, and calcium channel blockers, supported by robust clinical evidence but limited by side effects and adherence issues. Unani medicine interprets hypertension as Ziyadat-e-Dam or Imtila' (vascular congestion and humoral excess) and manages it through Ilaj bil Ghiza (diet), Ilaj bil Tadbeer (regimens), and Ilaj bil Dawa (drugs). Overlaps include dietary moderation, exercise, and stress management. Unani agents such as Rauwolfia serpentina and Terminalia arjuna show reductions of 10-15 mmHg in systolic pressure when used adjunctively.
Conclusion: Integrating Unani and allopathic principles can provide sustainable, culturally sensitive, and evidence-informed strategies for global hypertension management.

1. Introduction

Hypertension, often referred to as the "silent killer," affects over 1.4 billion individuals worldwide and is responsible for nearly 10 million deaths annually. It is a chronic medical condition characterized by sustained elevation of arterial blood pressure, typically defined as systolic ≥140 mmHg or diastolic ≥90 mmHg according to standard clinical guidelines [1,2]. Despite the availability of effective pharmacological agents, control rates remain suboptimal due to poor adherence, lifestyle factors, and adverse effects. Globally, the prevalence of hypertension in adults exceeds 30%, with a disproportionately high burden in low- and middle-income countries [3].

Historically, the conceptualization of hypertension has evolved considerably. Modern medicine recognizes essential (primary) hypertension as a multifactorial disorder involving the renin-angiotensin-aldosterone system (RAAS), sympathetic nervous system overactivity, endothelial dysfunction, and genetic predisposition [4,5]. Well before the advent of allopathic medicine, traditional systems such as Unani medicine, rooted in Greco-Arabic traditions, conceptualized circulatory disorders through the principles of humoral theory and Mizaj (temperament). Hypertension-like conditions were described as Imtila' (accumulation of morbid matter), Z'af al-Qalb (cardiac weakness), and Inhimar al-Dam (blood surging) [6].

The growing interest in traditional medicine stems from the limitations of long-term pharmacotherapy, including side effects, cost, and low adherence. The World Health Organization (WHO) has emphasized integrating traditional and complementary medicine into national health systems to promote holistic and culturally appropriate care [7]. Traditional systems like Unani focus on restoring systemic balance through lifestyle modification, diet, and natural therapeutics, offering valuable insights for sustainable, patient-centered care.

This review provides a comprehensive analysis of hypertension management in both Unani and allopathic systems. By examining their conceptual frameworks, diagnostic approaches, and therapeutic strategies, the paper aims to identify areas of convergence and highlight opportunities for integrative innovation to improve patient outcomes and public health.

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2. Methodology

Review Design

A narrative review approach was employed following the SANRA (Scale for the Assessment of Narrative Review Articles) guidelines to ensure methodological rigor and transparency. The review aimed to provide a structured comparative analysis of hypertension management in Unani and allopathic medical systems.

Data Sources and Search Strategy

Literature was retrieved from electronic databases, including PubMed, Scopus, AYUSH Research Portal, WHO Global Index Medicus, and ScienceDirect, covering the period 2020- 2025. Classical Unani texts such as Al-Qanoon fi al-Tibb by Ibn Sina and Kitab al-Hawi by Al-Razi were consulted in their original or translated Arabic/Urdu versions. Relevant reports and guidelines from the World Health Organization (WHO), American Heart Association (AHA), European Society of Cardiology/European Society of Hypertension (ESC/ESH 2023), and the Central Council for Research in Unani Medicine (CCRUM) were also included [8-11].

The electronic search strategy employed Boolean combinations of keywords such as:
"Hypertension Unani", "Imtila' and blood pressure", "Herbal antihypertensives", "Unani cardiotonic drugs", "RAAS blockers", "Z'af al-Qalb", "Ilaj bil Tadbeer", and "Lifestyle and hypertension". These search terms were designed to encompass both theoretical and clinical perspectives of hypertension management across the two systems.

3. Inclusion and Exclusion Criteria

Inclusion criteria: Inclusion criteria: Peer-reviewed studies, clinical trials, and systematic reviews on hypertension management in Unani and allopathic systems. Classical Unani references (translated or original Arabic/Urdu texts). National and international clinical practice guidelines (e.g., WHO 2021, ESC/ESH 2023, AHA 2025, CCRUM 2023, JNC 7, JNC 8). [12,13,].

Exclusion criteria: Non-peer-reviewed, anecdotal, or editorial sources lacking scientific credibility. Duplicate studies or articles not available in English, Urdu, or Arabic translations.

Data Extraction and Thematic Analysis

A **thematic comparison** was performed under the following domains: Pathophysiological concepts, Diagnostic approaches, Therapeutic modalities, Preventive strategies, Integrative possibilities. The conceptual framework sees in the table 1.

Diagnostic Approaches

- **Unani Medicine:** Relies on pulse examination (*Nabz*), observation of complexion (*Lawn*), urine and stool characteristics, and patient temperament (*Mizaj*).
- **Allopathic Medicine:** Utilizes sphygmomanometry, ambulatory blood pressure monitoring, biochemical analysis, and imaging for secondary causes.

4. Therapeutic Modalities

A. Unani System

***Ilaj bil Ghiza* (Dietotherapy):** Low-salt, light, and moist diet such as barley soup (*Jau ka yakhni*), pomegranate, cucumber, and garlic; avoidance of red meat and spicy food.

***Ilaj bil Tadbeer* (Regimenal Therapy):** *Hijama (cupping)*, *Fasd (venesection)*, massage, exercise, and *Hammam* (steam bath) to regulate blood and remove waste humors.

Ilaj bil Dawa (Pharmacotherapy): Use of antihypertensive herbs such as Rauwolfia serpentina (Asrol), Terminalia arjuna (Arjun), Allium sativum (Lehsan), and Coriandrum sativum (Dhania) for vasodilation and blood purification.

B. Allopathic System

Evolution of Hypertension Concepts in Allopathic Medicine

The understanding of hypertension within modern (allopathic) medicine has evolved profoundly over the past century. Initially described as "essential hypertension" in the early 20th century, the condition was regarded as idiopathic, with no clear etiological basis [14]. However, contemporary research has established that hypertension is a complex, multifactorial disorder arising from dynamic interactions among genetic, neurohormonal, renal, vascular, and lifestyle-related determinants [15].

4. Key Physiological Systems Involved

a. Renin-Angiotensin-Aldosterone System (RAAS): The RAAS plays a pivotal role in blood pressure regulation and fluid–electrolyte balance. Hyperactivation of this system leads to vasoconstriction, sodium and water retention, and increased peripheral vascular resistance key mechanisms underlying sustained hypertension [16].

b. Sympathetic Nervous System (SNS): Chronic overactivity of the sympathetic nervous system (SNS) contributes to elevated heart rate, increased cardiac output, and peripheral vasoconstriction. Persistent sympathetic stimulation induces vascular remodelling, endothelial dysfunction, and cardiac hypertrophy, perpetuating hypertensive pathology [17].

c. Endothelial Dysfunction and Vascular Resistance: Endothelial dysfunction is central to the pathogenesis of hypertension. It involves reduced nitric oxide bioavailability, enhanced oxidative stress, and inflammatory activation, all of which promote vasoconstriction, arterial stiffness, and atherosclerosis [18].

5. Classification and Therapeutic Framework

Several authoritative classification systems including the Joint National Committee (JNC 8), American Heart Association (AHA), and European Society of Cardiology/European Society of Hypertension (ESC/ESH)-have provided diagnostic and therapeutic frameworks. The ESC/ESH 2023 guidelines define hypertension as sustained systolic blood pressure ≥140 mmHg or diastolic ≥90 mmHg, while the AHA's 2017 criteria adopt a lower threshold (≥130/80 mmHg) to enable earlier intervention [19].

The therapeutic approach prioritizes individualized management through pharmacological classes such as angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), beta-blockers, calcium channel blockers, and diuretics. Current clinical recommendations emphasize risk stratification, comorbidity assessment, and lifestyle modification as integral components of comprehensive hypertension care [13].

Diagnostic Tools

The diagnosis of hypertension in modern medicine is primarily clinical, based on repeated and standardized blood pressure measurements using a sphygmomanometer. Ambulatory

blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) provide more representative assessments and help identify conditions such as white coat and masked hypertension [20]. Laboratory investigations, including renal function tests, lipid profiles, and electrocardiography (ECG), are integral for evaluating end-organ damage and identifying secondary causes.

6. Evolution of Hypertension Concepts in Unani Medicine

Unani medicine, the classical Greco-Arabian system, does not define "hypertension" as a discrete entity but interprets elevated blood pressure and its sequelae through various traditional concepts. The central pathological process is *Imtila'*, denoting an abnormal accumulation of humors or blood within the vessels due to over-nutrition, faulty digestion, or impaired elimination [21]. Imtila' is categorized as *Imtila' bi Hasb al-Kammiyat* (quantitative congestion) and *Imtila' bi Hasb al-Kayfiyat* (qualitative congestion), both leading to vascular overload and pressure-related manifestations [22].

Several Unani conditions parallel modern hypertensive states:

- ***Z'af al-Qalb*** (cardiac weakness) aligns with decreased myocardial efficiency.
- ***Sudda*** (vascular obstruction) corresponds to atherosclerotic narrowing.
- ***Inhimar al-Dam*** (blood surging) resembles hyperdynamic circulation or hypertensive crisis [23].

Clinical studies indicate that approximately 51.7% of patients with Grade I essential hypertension exhibit *Damvi Mizaj* (sanguine temperament), supporting the view that an excess of this hot-moist temperament predisposes to vascular disorders [24]. Emotional stress, anger, anxiety, rich and salty diets, and a sedentary lifestyle are key precipitating factors for Imtila' and related cardiovascular disturbances [25].

Classical scholars such as Ibn Sina (Avicenna) in *Al-Qanoon fi al-Tibb*, Al-Razi in *Kitab al-Hawi*, and Jurjani in *Zakhira Khwarzam Shahi* discussed cardiac dynamics, vascular tension, and pulse characteristics that prefigure the modern understanding of hypertensive pathology [26]. Thus, Unani medicine provides a systemic model linking temperament, lifestyle, and humoral imbalance to cardiovascular health.

7. Comparative Diagnostic Approaches in Unani and Allopathic Systems

Modern (Allopathic) Diagnostics

Hypertension diagnosis in allopathic medicine relies on accurate and repeated sphygmomanometric readings (digital or manual). ABPM and HBPM help assess diurnal variations and refine prognosis by detecting white coat and masked hypertension [27]. Laboratory evaluation serum electrolytes, renal function (creatinine, eGFR), lipid profile, and fasting glucose assists in identifying secondary hypertension and target-organ damage. Echocardiography and fundoscopic examination further evaluate complications such as left ventricular hypertrophy and hypertensive retinopathy [28].

Unani Diagnostics

In Unani practice, diagnosis is qualitative and holistic, based on *Mizaj* (temperament), *Nabz* (pulse), and *Baul/Baraz* (urine and stool characteristics). Pulse examination provides critical insight into blood quantity and quality, cardiac vigor, and congestion (*Imtila'*) patterns. Comprehensive clinical assessment also includes observation of complexion, tongue colour, emotional state, and lifestyle reflecting the patient's *Tabiyat* (constitution) and humoral imbalance [29]. Although Unani medicine lacks invasive testing, it employs a sophisticated, codified system of clinical observation developed over centuries to identify vascular disturbances comparable to hypertension [30].

Integrative Reflections

Both Unani and allopathic frameworks emphasize early detection, systemic assessment, and risk-factor analysis. Emerging research seeks to integrate Unani pulse analysis with digital tonometry and correlate *Mizaj* with genetic and metabolic markers, offering promising directions for holistic diagnostic models [31].

8. Comparative Therapeutic Strategies in Unani and Allopathic Systems

Modern (Allopathic) Therapeutic Strategies

Contemporary management of hypertension follows evidence-based guidelines such as the 2023 European Society of Hypertension (ESH) and 2025 AHA/ACC recommendations. First-line drug classes include ACE inhibitors, angiotensin receptor blockers (ARBs), calcium channel blockers (CCBs), and thiazide or thiazide-like diuretics. Beta-blockers remain preferred for patients with concurrent ischemic heart disease or arrhythmias. The therapeutic goal is to maintain blood pressure below 130/80 mmHg, individualized to comorbidities and treatment tolerance [12].

Pharmacologic categories and mechanisms include:

a. **ACE inhibitors** (e.g., enalapril, lisinopril)- inhibit the RAAS pathway and preserve renal function.
b. **ARBs** (e.g., losartan, valsartan)- block angiotensin II receptors, reducing vascular resistance with fewer side effects.
c. **CCBs** (e.g., amlodipine)- promote vasodilation via calcium channel blockade.
d. **Thiazide diuretics** (e.g., hydrochlorothiazide)- decrease plasma volume and peripheral resistance.
e. **Beta-blockers**- indicated in ischemic or arrhythmic conditions.

Lifestyle modification including sodium restriction, weight reduction, regular exercise, smoking cessation, and moderation of alcohol consumption remains a universal cornerstone of therapy [32].

Unani Therapeutic Strategies

Unani therapy for hypertension-related disorders focuses on eliminating the causative factor, *Imtila'* (vascular congestion), and restoring balance in the humors (*Akhlat*) and temperament (*Mizaj*). Treatment follows a holistic tri-modal approach, consisting of *Ilaj bil Tadbeer* (regimental therapy), *Ilaj bil Ghiza* (dietotherapy), and *Ilaj bil Dawa* (pharmacotherapy) [33,34].

a. *Ilaj bil Tadbeer* (Regimental Therapy)

Regimental therapy involves lifestyle and procedural interventions designed to correct humoral imbalance and enhance overall physiological harmony. Among these, *Hijama* (wet cupping) is particularly emphasized in Unani practice for conditions associated with *Imtila'* and hyperdynamic circulation.

***b. Hijama* (Wet Cupping)**

Hijama is a traditional Unani technique in which localized negative pressure is applied using cups, followed by superficial skin incisions to draw small quantities of blood. This practice is believed to remove *Mawad-e-Fasida* (morbid humors), improve circulation, and restore homeostasis.

Procedure: The procedure begins with the preparation of the selected site commonly between the shoulders (*Al-Kahil*), the upper back, or disease-specific points which is sterilized thoroughly. A cup is applied to create negative pressure (traditionally using fire, or modern suction pumps), drawing blood toward the surface. Superficial scarifications are then made using a sterile blade, and the cup is reapplied to extract a small volume of blood. The site is subsequently cleaned and dressed, and the patient is advised to rest [35].

Clinical Case Study

A case published in the *Journal of Ayurveda and Integrative Medicine* reported a 42-year-old male with uncontrolled essential hypertension who underwent a series of Hijama sessions over the upper back and occipital region. After three sessions within four weeks, the patient's blood pressure improved significantly from an average of 162/98 mmHg to 138/86 mmHg without adverse effects. The improvement was attributed to the elimination of *Mawad-e-Fasida* and enhanced microcirculation induced by cupping. The authors concluded that Hijama could serve as an effective adjunctive therapy in hypertension management, while highlighting the need for larger controlled clinical studies [35].

Applications of *Hijama* in Hypertension

- Reduces blood pressure by decreasing blood volume and vascular resistance.
- Promotes relaxation and reduces sympathetic overactivity.
- Enhances cardiovascular efficiency and tissue perfusion.
- Serves as a complementary or adjunctive approach alongside modern antihypertensive drugs.
- Typically performed ten times at 15-day intervals at key anatomical sites-*Al-Kahil* (between the shoulders), *Akhda'ain* (lateral neck points), and *Yafookh* (vertex region) depending on the clinical presentation and individual *Mizaj*.

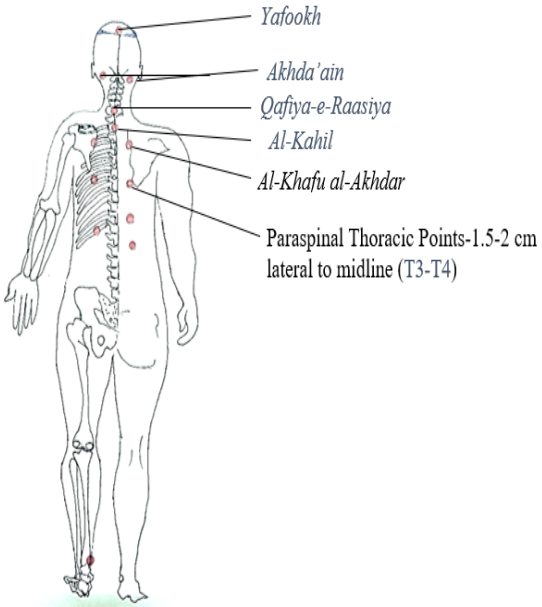

Figure 1: Hijama (cupping) multiple points for hypertension.

Abbreviation:
Yafookh: Vertex of the head ((topmost point).
Akhda'ain: The two jugular veins (both sides of the neck).
Qafiya-e-Raasiya: Base of the skull.
Al-Kahil: Between the shoulders (C7–T1 vertebral region / upper back).
Al-Khafu al-Akhdar: Upper back, between scapulae.

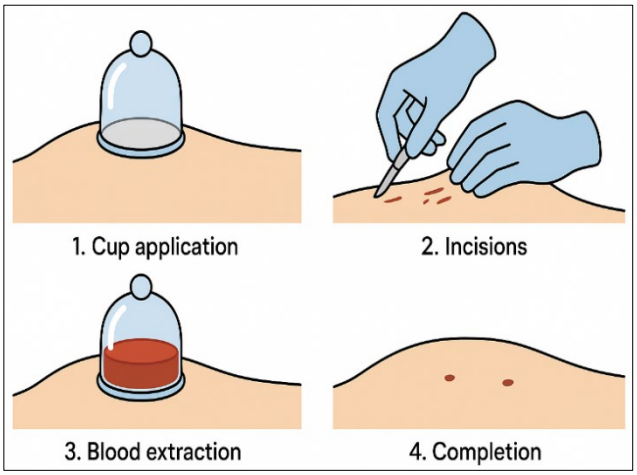

Figure 2: Procedure of *Hijama* (Wet Cupping); Improve circulation, reduce pressure, and restore balance in the body.

Table 1: Conceptual Framework

Spect	Unani Medicine	Allopathic Medicine
Disease Concept	*Ziyadat-e-Dam* (increase in blood volume or viscosity) and *Imtila'* (humoral congestion) leading to vessel tension and pulse elevation [9,10,14].	Persistent elevation of arterial pressure above normal physiological levels (≥140/90 mmHg) [8,11,12].
Etiology	Imbalance of humors (*Akhlat*), excess blood, improper diet, sedentary lifestyle, stress, and retention of waste humors [9,10,14].	Genetic predisposition, sodium retention, obesity, insulin resistance, endothelial dysfunction [8,11,12].
Pathogenesis	Derangement in *Mizaj* (temperament) and accumulation of morbid humors (*Akhlaat Fasadah*) causing vascular resistance [9,10,14].	Increased cardiac output and/or peripheral resistance leading to arterial stiffness [8,11,12].
Goal of Therapy	Restoration of humoral balance and temperament [9,10,13,14].	Blood pressure reduction to target levels and organ protection [8,11,12].

Table 2: Mechanistic Perspectives

Perspective	Mechanism of Action
Unani View	Removal of *Mawad-e-Fasida* (morbid matter), reduction of *Imtila'* (blood congestion), and restoration of humoral balance.
Modern View	Enhancement of microcirculation, modulation of the autonomic nervous system, reduction of oxidative stress, and improvement of vascular endothelial function.
Clinical Evidence	Preliminary studies suggest antihypertensive, analgesic, and detoxifying effects of Hijama, though large-scale randomized controlled trials are still warranted.

Table 3: Comparison of Ilāj *bil-Ghizā* (Unani dietotherapy) vs DASH & Mediterranean diets [50,51,47]

Domain	***Ilāj bil-Ghizā* (Unani dietotherapy)**	**DASH (Dietary Approaches to Stop Hypertension)**	**Mediterranean diet**
Primary goal	Restore humoral balance; reduce *Mawād-e-Fāsida* and blood viscosity; prevent *Ḍaghṭ al-Dam*	Lower BP by reducing sodium and improving dietary pattern (fruits/veg/low-fat dairy)	Cardiometabolic risk reduction via high plant-food intake, healthy fats (olive oil), moderate fish/wine
Key recommended foods	Barley water, cucumber, pomegranate, spinach, seasonal fruits, vinegar preparations; emphasis on light, easily digestible foods	Fruits, vegetables, whole grains, low-fat dairy, lean poultry, nuts; low in red meat, sweets; sodium restriction (≤2300 mg/d typical in trials, lower recommended clinically)	Vegetables, fruits, legumes, whole grains, nuts, olive oil primary fat, moderate fish/poultry, low red/processed meat
Foods commonly discouraged	Salted, fried, heavy (*ghalīz)* foods, excessive meat, deep-fried preparations	High-sodium foods, processed meats, sugar-rich foods	Excessive processed foods, high red/processed meat, refined carbs
Mechanisms (Unani description and modern physiology)	Reduce blood thickness and stagnation (Unani)- lowers blood viscosity, enhances microcirculation, and decreases sympathetic activity, promoting smoother blood flow, better tissue perfusion, and improved cardiovascular efficiency.	Reduced sodium lowers plasma volume and vascular resistance, while higher potassium, calcium, and magnesium improve vascular tone, relaxation, and endothelial function, supporting cardiovascular health.	An increased intake of monounsaturated fats and polyphenols enhances endothelial function, reduces vascular inflammation, and decreases arterial stiffness.
Typical effect on BP (evidence) Evidence type & quality	Case reports/case series: clinically meaningful reductions reported (variable; uncontrolled). Evidence level: low (case-level). Traditional texts+ case reports; need larger RCTs and standardized protocols	RCTs/meta-analyses: SBP reductions 5-11 mm Hg (varies by baseline BP and adherence). Evidence level: high (multiple RCTs). Large RCTs (DASH), multiple meta-analyses of RCTs	RCTs/meta-analyses (eg, PREDIMED): modest SBP reductions (~3-6 mm Hg) and broader cardiovascular risk reduction. Evidence level: high-moderate. Large RCTs (PREDIMED), many observational and RCT data
Practical implementation notes	Personalize to temperament (*mizāj*), seasonal advice, prefer light cooking methods (boiled/steamed),use barley water, seasonal fruits; Monitor electrolytes.	Structured meal plans, emphasis on sodium reduction, dietary counselling improves adherence.	Encourages olive oil use, nuts, plant-forward meals; culturally adaptable; beneficial for overall CV risk.
Safety considerations	Monitor for unintended weight loss, electrolyte imbalance if extreme changes; ensure nutritional adequacy	Ensure potassium, magnesium balance in special populations (renal disease).	Monitor caloric intake; in some patients, fat intake adjustments may be needed (eg, hyper triglyceridemia)

***c. Fasd* (Venesection)**

Fasd, or therapeutic venesection, is an established regimen in Unani medicine classified under *Ilaj bil Tadbeer* (regimental therapy). This procedure entails a controlled incision of a superficial vein to evacuate *Akhlaat-e-Faasida* (morbid humours), thereby alleviating *Imtila*' and restoring humoral balance. It is regarded as one of the more potent interventions in regimental therapy for circulatory and congestion-related disorders.

Case Reports and Clinical Observations

Case 1: Ali et al (2022) reported on the application of Fasd in *Irq-Un-Nasa* (sciatica). In this case series, two patients underwent venesection of the saphena minor vein twice weekly for two consecutive sessions. Follow-up was conducted telephonically over two months. Both patients experienced significant symptomatic relief without recurrence, suggesting that Fasd may offer therapeutic benefit in neuralgia via humoral drainage [36].

Case 2: A randomized intervention by Jeitler et al (2022) offers relevant modern clinical evidence supporting the traditional Unani use of Fasd in hypertension. In this trial, scheduled therapeutic phlebotomy was performed in individuals with Grade 1 hypertension, resulting in statistically significant reductions in blood pressure. The outcomes align with classical Unani indications for *Ḍaghṭ al-Dam Qawi* (strong vascular pressure) and support the mechanistic rationale of Fasd in hypertension management [37].

Mechanistic and Therapeutic Insights

- **Unani Perspective:** Fasd is believed to directly remove excess or pathological humours, thereby alleviating vascular load and restoring *Mizaj* balance.
- **Modern View:** Therapeutic phlebotomy (comparable to Fasd) may reduce blood volume, lower haematocrit, improve blood rheology, and diminish peripheral resistance mechanisms relevant to blood pressure reduction.
- **Clinical Relevance:** While Fasd has historical precedent in Unani literature, controlled trials in hypertension are sparse. The study by Jeitler et al (2022) provides preliminary evidence that venesection may be a viable adjunct to standard antihypertensive therapy in selected patients with mild hypertension [37].

Here; Table 2 outlines the mechanistic perspectives of hypertension management, contrasting Unani principles with modern biomedical interpretations and supporting clinical evidence.

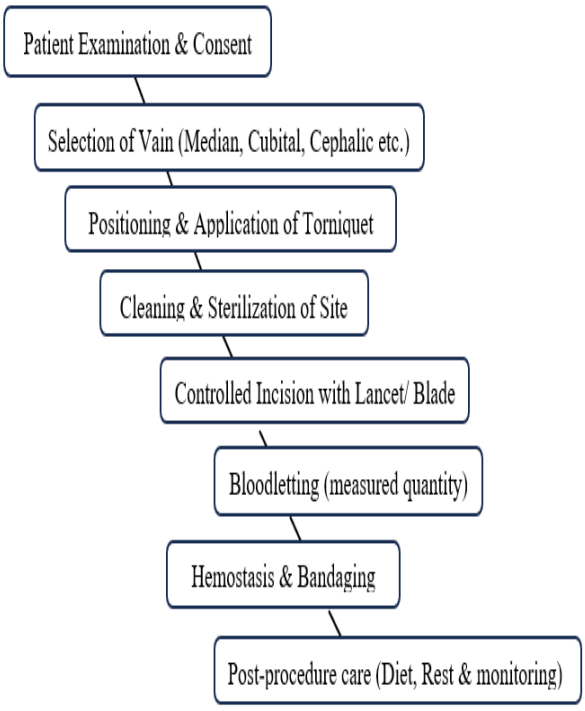

Figure 3: Fasd (Venesection) Procedure- Flowchart

9. Unani Therapeutic Strategies: Dalak, Riyāzat, Hammām, and Dietotherapy

***Dalak* (Massage)**

In Unani medicine, ***Dalak*** (massage) is traditionally advocated to harmonize humors, enhance blood circulation, relieve stress, and reduce factors associated with *Ḍaghṭ al-Dam* (hypertension). Modern evidence increasingly supports these views: massage therapy has been shown to modulate autonomic balance (increasing parasympathetic tone), induce relaxation, reduce muscle tension, suppress sympathetic activity, and improve peripheral circulation [38].

A recent meta-analysis of randomized controlled trials involving 290 participants (148 in massage groups, 142 controls) found minimal reductions in both systolic and diastolic blood pressure. However, high heterogeneity among studies suggested the need for more standardized research protocols. The standardized mean differences (SMD) reported were: SBP: -0.65 mm Hg (95% CI: -4.75 to 3.55); DBP: -0.68 mm Hg (95% CI: -2.43 to 1.06) [39].

***Riyāzat* (Exercise)**

In Unani medicine, *Riyāzat* (exercise) is regarded as a pivotal preventive and therapeutic regimen (*Ilāj bi'l-Tadbīr*) for maintaining humoral balance, promoting healthy circulation, and preventing the accumulation of morbid matter (*Mawād-e-Fāsida*). Classical Unani physicians such as Ibn Sīnā emphasized the role of regular, moderate exercise in strengthening the heart and vessels, enhancing digestion, and preserving overall vitality.

In the context of *Ḍaghṭ al-Dam* (hypertension), exercise is believed to reduce excessive heat and viscosity of blood, improve metabolic activity, and alleviate mental stress factors closely associated with elevated blood pressure. By stimulating the elimination of waste materials and optimizing circulation, *Riyāzat* supports the restoration of *Mizāj* (temperament) and vascular equilibrium [40].

Modern evidence substantiates these traditional insights. Regular physical activity has been shown to lower blood pressure by improving endothelial function, increasing nitric oxide bioavailability, reducing arterial stiffness, and modulating autonomic activity. A recent meta-analysis (2024) demonstrated that both aerobic and resistance training significantly reduced systolic and diastolic blood pressure among hypertensive patients, confirming the efficacy of structured exercise programs in cardiovascular regulation [40].

Case Study

A case reported in the *Hippocratic Journal of Unani Medicine* described a 42-year-old male with newly diagnosed hypertension presenting with headache and disturbed sleep. The patient underwent a 7-day course of *Naṭūl* therapy (therapeutic walking in shallow water), resulting in meaningful reductions in blood pressure, relief from head heaviness, and improved sleep quality. This observation illustrates the therapeutic potential of traditional Unani exercise regimens in early hypertension management [41].

Contemporary clinical evidence parallels these findings. A systematic review and meta-analysis of randomized controlled trials revealed that consistent aerobic and resistance training produce significant reductions in both systolic and diastolic blood pressure through enhanced endothelial function, greater nitric oxide release, decreased arterial stiffness, and improved autonomic balance [40]. These outcomes align closely with Unani

principles describing exercise as a means of humoral balance and cardiovascular harmony.

***Hammām* (Steam Bath)**

In **Unani medicine**, *Hammām* (steam bath) is a classical *Ilāj bi'l-Tadbīr* (regimental therapy) employed to reduce excess blood (*Imtilā'*), relieve vascular congestion, and restore humoral equilibrium. The therapy involves exposure to controlled steam to induce perspiration, promote relaxation, and facilitate the excretion of waste materials (*Mawād-e-Fāsida*). It is traditionally recommended for patients exhibiting symptoms of *Ḍaghṭ al-Dam* (hypertension), especially when associated with stress, irritability, or disturbed sleep [42].

From a physiological perspective, *Hammām* promotes vasodilation of superficial blood vessels, reduces peripheral resistance, and enhances cutaneous circulation. The induced relaxation response also modulates autonomic balance by lowering sympathetic tone and supporting parasympathetic activation mechanisms that contribute to blood pressure reduction and cardiovascular well-being.

Case Study

A case published in the *Hippocratic Journal of Unani Medicine* described a 50-year-old hypertensive male presenting with headache, irritability, and insomnia. The patient underwent a 10-day course of *Hammām* therapy, consisting of daily steam bath sessions lasting 15-20 minutes under supervision. Following the regimen, there was a marked reduction in both systolic and diastolic blood pressure, improved sleep quality, and relief from stress-related symptoms. No adverse effects were reported during or after the treatment. These findings highlight the potential of *Hammām* as a safe, non-pharmacological adjunct in integrative hypertension management [42].

10. *Ilāj bil Ghiza* (Dietotherapy)

Dietotherapy in Unani medicine holds a primary place in chronic conditions like Ḍaght al-Dam (hypertension). Classical texts such as *Al-Qānūn fi'l-Ṭibb* and *Kāmil al-Ṣanā'ah al-Ṭibbiyyah* recommend regulation of diet to maintain humoral equilibrium, avoid accumulation of *sauda* (black bile) and excessive *dam* (blood), and reduce dietary contributors to vascular heaviness [43]. Foods described as light (*latīf*), easily digestible, blood-purifying (*musaffī-e-dam*), blood-reducing (*muqallil-e-dam*), and deobstruent (*mufattiḥ*) are preferred. Heavy, salted, fried, or overly rich foods are discouraged as they are thought to thicken blood, impair vascular flow, and worsen elevated pressure. Modern nutrition research aligns with these recommendations: diets rich in fruits, vegetables, low in sodium, and whole grains (e.g., the DASH and Mediterranean diets) have been shown to reduce both systolic and diastolic blood pressure significantly in diverse populations [44,45]. Case-based evidence from Unani literature also supports this: for example, a patient managed primarily through diet regulation, including salt restriction, consumption of barley water, and seasonal fruits, reported improvements in symptoms (headache, dizziness) and measurable blood pressure reductions [46].

Integrative Perspective

he integration of Unani holistic regimens with allopathic pharmacotherapy offers a comprehensive approach to managing hypertension by addressing both symptomatic control and underlying pathophysiological imbalances [34]. Such an integrative model harmonizes evidence-based interventions from both systems, enhancing therapeutic efficacy and patient well-being.

Hijāmah (cupping) and Ilāj bil-Tadbīr (regimental therapy) have been shown to improve microcirculation, modulate autonomic balance, and enhance stress resilience. The key factors implicated in the pathogenesis of hypertension [35]. Hammām (steam therapy) and other heat-based regimens promote relaxation, vasodilation, and improved endothelial function, potentially reducing blood pressure through nitric oxide-mediated vascular modulation and stress reduction mechanisms [47].

Herbal formulations, such as *Rauwolfia serpentina*, traditionally used in Unani and Ayurvedic systems, exhibit established antihypertensive properties and have led to the discovery of pharmacologically active compounds like reserpine, bridging traditional and modern therapeutics [48].

Unani dietary principles emphasize moderation, salt restriction, and consumption of *latīf* (light) and *musaffī-e-dam* (blood-purifying) foods, closely aligning with modern dietary frameworks such as the DASH and Mediterranean diets, thereby offering synergistic cardiovascular benefits [49].

A structured integrative hypertension management model could include:

- **Primary Screening and Diagnosis** using allopathic clinical and diagnostic protocols.
- **Adjunct Unani Regimens *(Ilāj bil-Tadbīr)*** focusing on detoxification, lifestyle correction, and stress management.
- **Herbal Adjuvants** for mild to moderate hypertension, tailored according to *Mizāj* (temperament) and individual risk profiles.
- **Continuous Monitoring** through standardized, evidence-based parameters combining both biomedical and traditional health indicators to ensure safety, efficacy, and long-term blood pressure control.
- Ilāj bil-Ghizā, the Unani principle of dietary management, emphasizes individualized nutrition aimed at restoring humoral balance and maintaining cardiovascular health. Its core philosophy aligns with the preventive focus of modern dietary models such as the DASH and Mediterranean diets, both of which are clinically proven to reduce blood pressure and cardiovascular risk. The following table **(Table 3)** presents a comparative overview of the Unani dietary approach and these evidence-based modern diets, highlighting key similarities and distinctions in composition, principles, and therapeutic outcomes.

***Ilāj bil Dawa* (Pharmacotherapy)**

In Unani medicine, pharmacotherapy focuses on correcting underlying humoral imbalances, reducing *Imtila'*, strengthening cardiac function, and regulating blood flow. Commonly prescribed Unani antihypertensive and cardiotonic herbs include *Zarnab* (*Taxus baccata*), *Sankhaholi* (*Evolvulus alsinoides*), *Gul-e-Arman* (*Carthamus tinctorius*), and *Asrōl* (*Rauwolfia serpentina*), the latter being a well-known source of the antihypertensive alkaloid reserpine [52]. The Unani approach emphasizes long-term restoration of physiological equilibrium rather than mere symptomatic relief, thereby offering a holistic and preventive perspective. Recent studies indicate that combining Unani herbal therapies with conventional antihypertensive medications may improve therapeutic outcomes, reduce adverse effects, and

enhance patient adherence. Such integrative strategies aim to synergize the corrective, preventive focus of Unani pharmacotherapy with the rapid efficacy of modern drugs. However, robust, large-scale clinical trials are required to validate the safety, efficacy, and optimal protocols for these integrative approaches [53].

12. Challenges in Integrative Hypertension Management

1. Scientific Validation

Despite promising therapeutic outcomes reported for both Unani and allopathic systems in hypertension management, the scientific validation of Unani interventions remains insufficient. A major limitation is the lack of large-scale, multicentric randomized controlled trials (RCTs) meeting contemporary evidence-based medicine standards. Most Unani antihypertensive therapies, comprising herbal, dietary, and regimental components, are supported primarily by observational studies or small-scale trials, limiting their translational value and global recognition. Strengthening pharmacological, toxicological, and clinical evidence through standardized methodologies is essential to establish Unani treatments within integrative frameworks. This need is further underscored by growing consumer interest and demand for traditional and integrative medicine worldwide [54].

2. Divergent Diagnostic and Therapeutic Philosophies

A fundamental barrier to integration arises from the philosophical differences in diagnosis and treatment paradigms. Allopathic medicine relies on measurable, quantifiable parameters such as systolic and diastolic blood pressure levels to determine disease severity and therapeutic efficacy. Conversely, Unani medicine adopts a qualitative, individualized diagnostic model, focusing on temperament (*Mizaj*), humoral imbalance (*Akhlat*), and systemic congestion (*Imtila*') [55]. These contrasting principles, while valuable within their own contexts, often create challenges in developing unified diagnostic criteria or shared treatment protocols in clinical practice.

3. Regulatory and Policy Constraints

Regulatory inconsistencies and fragmented policy frameworks further hinder the integration of Unani medicine into mainstream healthcare. In many regions, Unani systems lack globally harmonized standards for formulation quality, safety evaluation, and clinical certification. The absence of dedicated regulatory bodies and limited inclusion of Unani pharmacopoeia in international drug compendia impedes access to validated formulations. Additionally, the scarcity of structured integrative training programs restricts clinicians' capacity to apply both systems synergistically in patient care. Addressing these gaps is crucial for implementing safe and evidence-based integrative hypertension management strategies [56].

4. Patient Perception and Trust

Patient perception plays a pivotal role in shaping the success of integrative models. Cultural beliefs, social background, and prior healthcare experiences influence whether individuals trust Unani, allopathic, or combined approaches. In some populations, skepticism toward traditional therapies persists due to concerns about standardization and efficacy, whereas in others, Unani medicine is perceived as more 'natural' and holistic. Evidence from clinical trials comparing Unani formulations with conventional antihypertensive drugs can help build confidence in integrative strategies and enhance patient engagement, shared decision-making, and adherence—key components of sustainable hypertension management [57].

5. Standardization of Unani Therapies

Perhaps the most critical scientific challenge lies in the standardization of Unani formulations and regimental therapies. Many preparations are individualized, with variations in dosage, plant source, and compounding methods across practitioners. Such heterogeneity complicates reproducibility, dosage accuracy, and safety profiling. Establishing standard operating procedures (SOPs) for the identification, processing, and quality control of Unani drugs, coupled with modern analytical tools such as HPLC and LC-MS, could enhance reproducibility and promote clinical credibility, while still respecting the principles of temperament-based individualized care central to Unani medicine [58].

Prospects for Integrative Hypertension Management

Holistic and Root-Cause-Oriented Approach

Integrating the Unani emphasis on holistic well-being and humoral balance with the precise pharmacological control of allopathic medicine can substantially improve therapeutic outcomes. The Unani concept of *Imtila*' (vascular congestion resulting from humoral imbalance) parallels biomedical mechanisms such as endothelial dysfunction, increased peripheral resistance, and oxidative stress. By addressing these root causes through dietary regulation (*Ilaj-bil-Ghiza*), detoxification, and regimental therapy (*Ilaj-bil-Tadbeer*), Unani medicine offers a multidimensional, preventive approach that complements modern pharmacological strategies focused primarily on symptom control. This convergence promotes not only blood pressure regulation but also systemic balance, stress reduction, and metabolic optimization, supported by molecular and systems pharmacology evidence of Unani antihypertensive herbs [59].

Synergistic Therapeutic Potential

Emerging pharmacological studies reveal potential synergistic interactions between Unani herbal drugs and contemporary antihypertensive agents. Asrol (*Rauwolfia serpentina*), a classical Unani remedy, contains reserpine and related alkaloids that act synergistically with angiotensin-converting enzyme (ACE) inhibitors or calcium channel blockers to enhance vasodilation and reduce vascular resistance. Other botanicals such as *Terminalia arjuna*, *Allium sativum*, and *Cinnamomum zeylanicum* have shown additive effects on lipid modulation and endothelial function. These combinations may enhance efficacy, lower required dosages, and minimize adverse effects. Nevertheless, comprehensive pharmacodynamic and pharmacokinetic evaluations are essential to ensure safety, dose compatibility, and long-term tolerability. [60].

Patient-Centered and Personalized Care

Integrative hypertension management aligns naturally with the patient-centered care paradigm. Unani medicine customizes interventions according to an individual's temperament (*Mizaj*), comorbidities, and psychosocial factors, while modern medicine contributes targeted pharmacological precision. This biopsychosocial integration fosters stronger therapeutic alliances, promotes adherence, and enhances quality of life in chronic hypertensive patients. Personalized care combining temperament-based regimens, modern diagnostics, and lifestyle modification ensures sustainable disease control and improved patient satisfaction [61].

Advances in Integrative Research and Evidence Generation

Recent interdisciplinary research is elucidating the molecular mechanisms underlying Unani formulations and their bioactive constituents. Advanced tools such as network pharmacology, metabolomics, and molecular docking are being employed to validate traditional formulations, identify novel drug targets, and assess safety profiles. Studies on classical Unani preparations like *Dawa-ul-Misk Motadil* and *Khamira Abresham Hakim Arshad Wala* have demonstrated cardiotonic and antihypertensive activity through nitric-oxide modulation and calcium-channel regulation. Standardized clinical protocols, combined with data-driven frameworks, are progressively bridging traditional wisdom with contemporary scientific evidence [60].

Future Directions

The advancement of integrative hypertension management requires a structured, evidence-based approach emphasizing both traditional efficacy and modern validation.

Key priorities include:

- Conducting large-scale, multicentric clinical trials on standardized Unani antihypertensive formulations.
- Developing unified diagnostic and treatment guidelines integrating Unani and modern parameters.
- Establishing robust regulatory and pharmacovigilance frameworks for herbal-drug standardization.
- Promoting clinician training and patient education on safe, integrative practices.
- Bridging classical Unani wisdom with modern scientific rigor holds immense potential for developing a sustainable, patient-centered, and globally applicable model for hypertension prevention and management.

Conclusion

Integrative management of hypertension represents a transformative paradigm that unites traditional Unani principles of balance and purification with evidence-based biomedical therapies. This multidimensional model not only addresses the physiological and molecular aspects of hypertension but also incorporates lifestyle, psychosocial, and preventive dimensions creating a holistic and globally relevant framework for cardiovascular health promotion.

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Conflict of Interest

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Authors' Contribution

All authors contributed equally to the study's conceptualization, literature survey, critical analysis, and manuscript preparation.

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Glossary:

- *Ziyadat-e-Dam- Hypertension.*
- *Fasd*- Phlebotomy,
- *Istifragh*- Evacuation or Expulsion.
- *Z'af al-Qalb*- cardiac weakness.
- *Imtila*- Congestion.
- *Baul*- urine.
- *Ilaj bil Ghiza*- Diet.
- *Hijama*- Cupping Therapy.
- *Hijama*- Cupping Therapy.
- *Akhlat*- Humours.
- *Inhimar al-Dam*- blood surging.
- *Akhlat*- Humours.
- *Baraz*- Stool.
- *Ilaj Bil Dawa*- Unani medicine.
- *Hammam*- Steam bath,
- *Riyazat*-Exercise,
- *Mizaj*-Temperament,
- *Raas- Head,*
- *Nabz*- Pulse,
- *Irq-Un-Nasa*-sciatica,
- *Mufattiḥ*- deobstruent,
- *Mizaj Haar Ratb*- Moist temperament.
- *Mawad-e-Fasida*-Morbid humour.
- *Musaffī-e-dam*-blood-purifying.
- *Ilaj-bit-Tadbeer*- Regimental therapy,
- *Naṭūl*- walking in shallow water,
- *Muaallil-e-dam* blood-reducing.