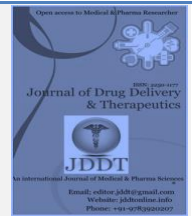


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Review Article

Unani Regimenal Therapy for Knee Osteoarthritis (*Waja 'al Rukba*): A Comprehensive Scientific Assessment

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Abstract

Pain in the joints has been a common and serious health issue for a long time. In Unani medicine, both inflammatory and non-inflammatory joint problems are grouped under the term "*Waja'al-Mafāṣil*," which means joint pain. Osteoarthritis, based on its symptoms, is very similar to a condition in Unani medicine called *Waja'al-Mafāṣil Balghamī*. One of the most common types of osteoarthritis is Knee Osteoarthritis (KOA), which is known in Unani medicine as *Waja'al Rukba*. This chronic and painful condition is usually treated with non-steroidal anti-inflammatory drugs (NSAIDs), but these drugs can have many side effects. In contrast, the Unani system of medicine uses a more comprehensive approach to manage osteoarthritis. *Waja'al Rukba* is managed with *Istefragh* (evacuation) followed by *Tadeel Mizaj* (rejuvenation), *Taqwiyat* (strengthened) and *Taskeen* (pain is relieved). *Istefragh* is achieved using specific Unani herbal treatments, like *Munzīj-Mushil* Therapy followed by *Tadeel Mizaj* using various techniques, including *Hijāma* (cupping), *Dalk* (massage), *Ta'liq al-Alaq* (leech therapy), *Ḥammām* (Turkish Bath), *Takmeed* (fomentation), *Naṭl* (irrigation), *Qay'* (vomiting), and *Ḥuqna* (enema). *Taskeen* and *Taqwiyat* are achieved using either medications or these modalities. This overview focuses on *Waja'al Rukba* and its Regimenal management.

Keywords *Ilājbi'lTadbīr*, Osteoarthritis, Unani, *Waja 'al Rukba*, *Waja'al Mafāṣil*,

Introduction

Osteoarthritis (OA) is the most common joint disease, causing pain and disability in many adults worldwide ¹. About 250 million people suffer from this degenerative joint condition ². In India, OA affects 22% to 39% of the population, making it the second most common rheumatologic issue ³. Risk factors for OA include genetics, being female, past injuries, aging, and obesity, with the last two being the most significant ⁴. OA can be classified into two types: primary (which develops on its own) and secondary (caused by other factors) ⁵. Common symptoms of OA include chronic pain, stiffness, joint instability, and narrowing of the joint space seen on X-rays ⁶. While new treatments are being explored, such as IL-1 antagonists and nerve growth factor antibodies ⁷, the main goals of OA treatment are to reduce pain, improve quality of life, and maintain joint

function. Non-drug approaches should always be the first step in managing OA ².

Waja'al-Mafāṣil is an Arabic term that means joint pain, particularly in the arms or legs. In Unani medicine, specific names are given depending on the joint affected, such as *Waja' al-Katif* for shoulder pain, *Waja'al-Mirfaq* for elbow pain, *Waja' al-Warik* for hip pain, *Waja' al-Aqib* for ankle pain, *Waja'al Rukba* for knee pain, *Waja'al Rukba* for neck pain (cervical spondylosis), *Niqris* for gout (pain in the big toe), *Waja'al-Zahr* for lower back pain, and *Irqal-Nasā* for sciatica (pain that starts in the hip and travels down the leg) ⁸.

The term *Waja'al-Mafāṣil* is widely used to describe joint pain. Several Unani physicians, including *Majūsi*, *Ibn Sīna*, *Rabban Tabri*, *Rāzi*, *Buqrāt* (Hippocrates), and *Jalinūs* (Galen), have explained this condition as being caused by imbalances in the *Akhlāt* (body's humours) ⁹.

According to *Zakaria Rāzi*, joint pain is primarily due to the buildup of abnormal humours in the joints, which come from abnormal digestion⁹. Specifically, the accumulation of abnormal *Balghamī* (phlegm) in the joints leads to an imbalance (*Sū-i-Mizā*) that causes pain and tenderness. The term *Waja'al-Mafāṣil Balghamī* describes this condition, which closely resembles osteoarthritis in modern medicine, affecting various joints. The aim for this review is to explore the Regimetal Therapy for the management of *Waja'al-Rukba* in contrast to Unani Classic Literature. This paper systematically describes the definition, causes, type, symptoms, and pathogenesis of *Waja'al-Rukba*. It is focused on various Regimetal Therapies for the management of *Waja'al-Rukba*.

Aetiology and predisposing factor

According to the Unani medical encyclopedia, the causes of *Waja'al-Mafāṣil* (joint pain) are divided into two main categories.

A. *Asbāb-i-faila* (subjective factors):

Pathology caused by *Sue Mizaj Sada or Maddi* directly affects the joints, leading to the accumulation of *mawad-i-fasida* (morbid humours) in the joints¹⁰.

B. *Asbāb-i-munfaila* (risk factors):

These are secondary factors that indirectly impact the joints, making them more likely to accumulate harmful substances (*mawad-i-fasida*), which can lead to changes in the structure and function of the joints¹⁰.

Jurjani described *Waja'al-Mafāṣil* as joint pain caused by harmful materials accumulating in the joints, leading to inflammation and pain. He categorized the causes of this build up into two types¹¹.

A. *Sabab-i-Asliya* (Actual cause)

B. *Sabab-i-Arziya* (Temporary cause)

A. *Sabab-i-Asliya* (Actual cause): It includes three factors

- Excessive joint movement
- Special anatomical joint structure
- Deficient *Quwwat-i-Hazimawa Dafea* (digestive and expulsive power) in the joints

B. *Sabab-i-Arziya* (Temporary cause): It includes risk factors similar to the conventional system of medicine.

- Lack or absence of exercise¹⁰
- Naqs-i-Ghiza* in terms of quality or quantity as well as timing of intake¹⁰
- Excessive intake of sweets, cold and moist diet¹⁰

- Taking alcohol or inebriant materials¹⁰
- Performing exercise and intercourse just after meal¹⁰
- Excessive cold and catarrh¹⁰
- Sudden cessation of a habitual *Istifragh* (evacuation)¹⁰
- Diversion of excessive abnormal humours towards the joint during the improper treatment of intestinal colic¹⁰
- Increasing age⁹
- Sufferer with chronic diseases⁹
- Males after marriage and females after menopause⁹
- Mosum-i-Rabi* (spring season) followed by *Mosum-i-Kharif* (autumn season)^{11,12}
- Sometimes heredity pattern was observed in this disease^{11,12}
- Over exhaustion, hard work, vigorous exercises, excessive sunlight exposure and tiredness exaggerate the disease^{10,11,12}

Mahiyat-i-Marz (Pathogenesis)

Joints are more susceptible organs to accumulating morbid matters due to¹¹

- Spacious structure as compared to other organs
- Bārid Yābis Mizaj* (cold and dry temperament)
- Weak *Quwwat-i-Hazima wa Dafea* (digestive and excretory powers)
- Gravity factor

The main cause of *Waja'al-Mafāṣil* is the development of *Balgham-i-Kham* (raw phlegm) from problems with digestion. When you move your joints, it helps move harmful substances from other parts of the body into the joints. Joints tend to attract and hold body fluids because of their structure and the cold nature of the tissues around them. If harmful substances collect in the joints, they are not properly removed, which leads to joint issues.

Balgham-i-Tabiee (Normal phlegm) is already in the joints and is cold and moist. When there's too much raw phlegm, it increases the coldness in the joints, leading to joint pain. The buildup of harmful substances causes pressure, inflammation, and symptoms like pain, stiffness, swelling, and redness. Over time, this can damage the cartilage and lead to joint problems^{10,11}.

Types of *Waja'al-Mafāṣil*^{8,10}

Waja'al-Mafāṣil is classified as follows which is shown in tables 1.

Based on the presence or absence of Akhlat-e-Fasida (Morbid Humours)	
<i>Waja'al-Mafāšil Sada</i>	<i>Waja'al-Mafāšil Maddi</i>
Based on Mizaj (Temperament)	
<i>Waja'al-Mafāšil Ḥārr</i> (Hot)	<i>Waja'al-Mafāšil Bārid</i> (Cold)
<i>Waja'al-Mafāšil Raṭb</i> (Wet)	<i>Waja'al-Mafāšil Yābis</i> (Dry)
<i>Waja'al-Mafāšil Ḥārr Raṭb</i> (Hot and Wet)	<i>Waja'al-Mafāšil Ḥārr Yābis</i> (Hot and Dry)
<i>Waja'al-Mafāšil Bārid Raṭb</i> (Cold and Wet)	<i>Waja'al-Mafāšil Bārid Yābis</i> (Cold and Dry)
Based on the type of Madda (Material) involved	
<i>Waja'al-Mafāšil Damawī</i> (Sanguineous)	<i>Waja'al-Mafāšil Ṣafrāwī</i> (Bilious)
<i>Waja'al-Mafāšil Balghamī</i> (Phlegmatic)	<i>Waja'al-Mafāšil Sawdāwī</i> (Melancholic)
<i>Waja'al-Mafāšil Reehi</i> (Pneumatic)	<i>Waja'al-Mafāšil Ufooni</i> (Infectious)
Based on the number of Khilt (Humour) involved	
<i>Waja'al-Mafāšil Mufrad</i> (due to involvement of single Khilt)	<i>Waja'al-Mafāšil Murakkab</i> (due to involvement of more than one Khilt)
Based on the severity and duration of the disease	
<i>Waja'al-Mafāšil Had</i> (Acute)	<i>Waja'al-Mafāšil Muzmin</i> (Chronic)
Based on the joint involvement	
<i>Waja-ul-Mirfaq</i> (Elbow Joint Pain)	<i>Waja-ul-Rukbah</i> (Knee Joint Pain)
<i>Waja-ul-Kaab</i> (Ankle Joint Pain)	<i>Waja-bain-al-Asabe</i> (Inter Phalangeal Joint Pain)
<i>Irq-un-Nasa</i> (Sciatica)	<i>Niqris</i> (Gout)
<i>Waja-ul-Eqab</i> (Heel Pain)	<i>Waja-ul-Qutn</i> (Low Back Pain)
<i>Hudbah</i> (Spinal Deformity)	<i>Waja-ul-Warik</i> (Hip Joint Pain)

Alamat (Clinical Features)				
Characters	<i>Waja'al-Mafāšil Balghamī</i> (Phlegmatic)	<i>Waja'al-Mafāšil Damawī</i> (Sanguineous)	<i>Waja'al-Mafāšil Ṣafrāwī</i> (Bilious)	<i>Waja'al-Mafāšil Sawdāwī</i> (Melancholic)
Onset	Gradual	Abrupt	Sudden	Slow
Nature of Pain	Throbbing	Severe	Excruciating	Mild
Swelling	Marked	More marked	Marked	Moderate
Touch	Soft & Cold	Soft & Warm	Hard & Warm	Hard & Cold
Skin over the joint	whitish	Reddish	Redting to yellowish	Bluish-Black
Aggravating Factors	Cold	Heat	Heat	Cold
Relieving Factors	Heat	Cold	Cold	Heat

***Waja'al Mafāšil Murakkab* (Involvement of compound/mixed humours)**

Waja'al-Mafāšil can be caused by a single *Khilt* as well as a combination of two or more *Akhlat*. Common combinations include *Balgham* (phlegm) with *Safra* (yellow bile) or *Sauda* (black bile) with *Safra*. The most serious type of *Waja'al-Mafāšil* is believed to be caused

by a mix of *Balgham-i-Ghaleez* (thick phlegm) and *Safra* (yellow bile) ^{8,13}.

***Waja'al Mafāšil Reehi* (Pneumatic)**

It is a rare type of joint pain. In this condition, the pain is mild and moves around rather than staying in one place. It causes more feeling of swelling or fullness rather than heaviness ^{8,14}.

Tashkhees (Diagnosis) ^{8,10}

The diagnosis of *Waja'al-Mafāsil* can be made through the following points:

- Onset of pain (gradual, abrupt, sudden) with or without heaviness
- Swelling (mild, moderate, severe)
- Change in skin colour over the joint (whitish, reddish, yellowish, bluish-black)
- *Lams* (tactile sensation/touch), *Nabz* (pulse), *Boul* (urine), *Baraz* (stool)
- Signs/symptoms of the involved *khilt*
- If shifting pain is mild without heaviness and with severe distension, it indicates involvement of *Riyah*.

Usool-e-Ilaj (Line of Management) ^{8,10,15}

In the early stages, *Waja'al-Mafāsil* can be treated easily. However, if it lasts for a long time, it becomes much harder to treat.

Izala-e-Sabab (Removal of cause)

Istifragh (evacuation of morbid material):

Treatment of the patient should be based on the concept of *Tanqia Mawade Raddiya* (evacuation of morbid matter), *Tadeel Mizaj* (rejuvenation of temperament), and *Taqwiat-i-Mafasil* (strengthening of joints). *Tanqiya* (evacuation) is achieved by *Munziji-wa-Mushil* therapy (concoction and purgation) and *Tadeel Mizaj* is by various drugs and regimenal modalities such as *Idrar* (diuresis), *Taareeq* (diaphoresis) *Qay'* (emesis), *Faşd* (venesection), *Hijāma* (cupping), *Huqna* (Enema), *Irsal-e-Alaq* (leech therapy), *Dalk* (Massage), *Nutool*

(irrigation), *Abzan* (sitz bath), *Amal-e-Kai* (cauterization), *Hammam* (medicated bath), *Pashoya* (footbath), *Riyazat* (exercise), and *Takmeed* (fomentation) etc.

Taqwiat-i-Mafasil (strengthening of the joint): It is achieved by various *Ghizai tadabeer*,

regimenal modalities as well as single and compound drugs.

Taskeen-e-Alam (analgesia): It is advisable to use oral as well as local application drugs for

relief of pain having medicinal properties such as *Musakkin* (analgesic), *Muhallil* (resolvent), *Qabiz* (astringent), *Raade* (Repellent), *Murakkhki* (local relaxant) *Mukhaddir* (anaesthetics), *Munawwim* (hypnotics).

'Ilāj bi'l Tadbīr (Regimenal Therapy)

Ilāj bi'l Tadbīr is the modification in *Asbāb Sitta Darūriyya* (Six Essential Factors). The six essential factors are: *Hawā'-e-Muheet* (Atmospheric air); *Ma'kulāt-o-Mashrūbāt* (Food and drinks); *Al-Ḥaraka wa'l Sukūn al-Badanī* (Physical activity and repose); *Al-Ḥaraka wa'l Sukūn al-Nafsānī* (Mental activity and repose); *Al-Nawm wa'l Yaqza* (Sleep and wakefulness); *Al-Iḥtibās-wa'l-Istifrāgh* (Retention and elimination) ⁴². *Ilāj bi'l Tadbīr* includes *Hijāma bish shart* (wet cupping), *Hijāma bila-shart* (dry cupping), *Ta'liq al-Alaq* (leeching), *Faşd* (venesection) *Qay'* (emesis), *huqna* (enema), *dalk* (massage) *Naṭūl* (irrigation), *abzan* (sitz bath), *riyazat* (exercise), *takmeed* (fomentation), *hammam* (Turkish bath), *amal-ikai* (cauterization), *pashoya* (footbath), etc.



Figure 1: Regimenal therapy for the management of knee osteoarthritis

Hijāma (Cupping)

Cupping therapy, also known as *Hijāma*, is a simple, safe, bearable, efficient, affordable, and time-saving program that can potentially improve quality of life and be useful in treating aches and pains in the head, neck, shoulders, and back. Cupping therapy is classified as *Hijāma bilā Shart* (dry) and *Hijāma bi'l Shart* (wet cupping). The act of dry cupping involves placing cups over the skin, applying a manual pump, electrical suction, or fire to create negative pressure inside the cups, and sitting up to ten to fifteen minutes. It improves a patient's quality of life and wellness, releases painful muscular tension, facilitates blood and lymph circulation to the affected area, and successfully reduces pain¹⁶. Wet cupping involves minimal superficial scarification to remove pathogenic chemicals that cause diseases from the interstitial spaces and improve blood flow. Several clinical trials proved the efficacy of both dry and wet cupping in the treatment of KOA-related pain, stiffness, swelling, and muscular weakening^{17,18}.

Ta'liq al-'Alaq (Leech Therapy)

A bloodletting therapy called hirudotherapy, medicinal leech therapy, or *Ta'liq al-'Alaq* uses bloodsucking leeches which are adhered to the skin in order to benefit from the medicinal properties of leech saliva secreted during feeding^[19]. There are about 20 different leech salivary compounds, and they have been reported to have thrombin regulating, analgesic, anti-inflammatory, platelet inhibitory, and anticoagulant properties, in along with antibacterial and extracellular matrix degradative actions²⁰. The application of medicinal leeches for the local evacuation of morbid humours is a regularly employed treatment in regimental therapy for treating a variety of illnesses, including *Waja'al Mafāsil*^{21,22,23}. The efficiency of this therapy may also be acknowledged to the *Musakkin* (sedative) and *Muhallil* (anti-inflammatory) actions of saliva of leeches^{10,12}. Research has proven the efficacy of leech therapy in KOA patients^{22,23}.

Qay'(emesis)

By developing an anti-peristaltic movement with particular *Advia-e-Muqiyat* (emetics), it is a simple but effective method to treat metabolic morbid humours (*istehalati-akhlat-i-raddiya*) not only from the stomach but also from whole body [8]. Unani practitioners have been using this regimen throughout ancient times to treat a variety of physical conditions, including headaches, migraines, melancholy, mania, liver disease, kidney disease, skin conditions, joint disorders, fever, and gastrointestinal disorders^{8,9,10,11,12,24,25,26,27}.

Dalk (Massage)

In order to achieve the therapeutic, restorative, and preventive goals, the affected region of the body is gently massaged with hands using medicated oil utilizing a variety of techniques that result in physiological and psychological therapeutic effects over the body and in pathological situations. *Dalk* had been identified as a *Riyādat* by Unānī physicians based on its actions. *Dalk* generates heat (*Laṭīf Ḥarārat*) in the body, which reduces *Burūdat* (coldness), dissolves *Rīḥi-*

Mawād (gas), and strengthens the muscles, ligaments, and tendons. It also dissolves and removes *Akhlat-i-Fāsida* (morbid humours), liquefies *Ruṭūbat-i-Badan* (body fluids). It relieves pain, reduce swelling, and helps evacuate waste product (*Fuḍlāt-i-Badaniyya*), which is produced at the end of digestion (*Ḥazm-i-akhir*), by evacuation and diverting adherent viscous morbid matter that has accumulated inside the joints^{25,26,27}. For patients with tendinitis, tendosynovitis, fibrositis, muscular spasm, ligament strain, postsurgical scar, postburn contracture, pre- and postoperative scars from plastic and reconstructive surgery, Bell's palsy, poliomyelitis, neurotmesis, and Guillain-Barre syndrome, massage is recommended²⁴. According to the Unani classical text, several therapeutic oil massage techniques are recommended for headache, gastrointestinal disorders, hepatic and renal disorders, chest and lung diseases, and musculoskeletal disorders^{8,9,12,13,25,26,27}.

Huqna (enema)

Huqna is the process of inserting a medicated liquid through the anus into the rectum and colon for a variety of therapeutic purposes, including bowel cleansing and bowel evacuation^{8,9,10,11,12,13,24,26,27}.

Faşd (Venesection/Phlebotomy)

It can also be referred to as venepuncture, phlebotomy, blood drawing, or blood cleansing. *Faşd* is a traditional regimental procedure in the Unani medical system. It involves making a small incision on a superficial vessel with a knife or scalpel and allowing blood containing *Mawād-i-Fāsida* (morbid material) to flow out. This process eliminates excess normal humours in the same proportion as present in the blood vessels or abnormal humours, or both²⁹. This helps diminish congestion, swelling, and acute pain by removing and diverting abnormal humours from the body. This type of therapy is recommended for several types of musculoskeletal and other conditions^{8,9,10,11,24,26,27}.

Tadhin (Oiling)

Ravghan Used in *Waja'al-Mafāsi* lare *Ravghan-i-Dhatura*, *Ravghan-i-Surkh*, *Ravghan-i-Suranjan*, *Ravghan-i-Gule Aak*, *Ravghan-i-Malkangni*, *Ravghan-i-Haft-i-Barg*, *Ravghan-i-Kuchla*, *Ravghan-i-Hina*, *Ravghan-i-Zanjabeel*, and *Ravghan-i-Shibba*^{30,31,32}.

Takmeed (Fomentation)

Takmeed is a medical practice that involves applying *Hār* (hot) or *Bārid* (cold) materials to the body in a therapeutic manner [33]. It provides various therapeutic benefits, including the relief of pain, the relaxation of muscular spasms, improved circulation, reduced inflammation, and enhanced body surface absorptive process^{34,35}. It is recommended for use in cases of joint, spinal, geriatric, kidney-bladder, gastrointestinal, and brain disorders, among others^{8,9,13,24}.

Clinical studies have demonstrated the effectiveness of both wet and dry takmeed in the management of KOA³⁴.

Ḥammām (Turkish bath)

A *Ḥammām* is a sort of bath where users can freely perspire in three rooms that are gradually heated up the first being the *Bārid - Raṭb* room, followed by the *Hār - Raṭb* room, and the last being the *Hār -Yābis* room. Regimen therapy is commonly used, and depending on the chamber used, it has a temperamental influence on the body. For a healthy individual, taking a cold bath (*Ghush-i-Bārid*) is recommended, while hot baths are typically used to treat illnesses. The therapy consists of several water-based body cleansing procedures^{10,34,36,37}. The benefits of *Ḥammām* include decocting morbid fluids, opening skin pores, softening and dissolving morbid fluids, stopping dysentery, reducing fatigue, releasing excess sweat, lowering the viscosity of humours, improving health, and eliminating waste materials through the skin^{9,10,11,14,24,26,27}. The recommended water temperature range for *Ḥammām-i-Hār* (hot baths) is 92-97 degree Fahrenheit, whereas 1300 degrees Fahrenheit is ideal for Turkish baths. Avoid spending too much time in the *Ḥammām* as it can lead to restlessness. Avoiding *Ḥammām* on an empty stomach is advised, and it is completely prohibited for people with *Ṣafrāwī Mizāj*, pregnant women, those with fevers, and those with asthenia³⁴. It is suggested after 3 hours taking meal. Indications for using *Ḥammām* include skin conditions, kidney diseases, gastrointestinal disorders, spleen and liver diseases, rheumatoid arthritis, gout, sciatica, cervical and lumbar spondylitis, CNS disorders such as paralysis, muscle atrophy, and numerous other conditions^{8,9,10,13,24,25,26,27}.

Ḍimād/Ṭilā'

Ḍimād is a herbal medication in a semisolid form that is applied topically to the body. *Ṭilā'* is a medicinal oil or liquid that is applied topically and slowly massaged into various body regions, allowing the medication to work its way into the skin. The therapeutic uses of *Ḍimād* and *Ṭilā'*, which include reducing inflammation and swelling, sedating and anesthesia, and removing morbid materials from areas of congestion, are significant in regimental therapy. Research has proven the efficacy of *Ḍimād* and *Ṭilā'* in KOA patients^{8,9,10,13,24,25,27,38,39}.

Naṭūl (Irrigation)

The *Naṭūl* therapy involves continuously pouring therapeutic oil, decoction, or infusion of herbs to various body areas from a fixed height for a predetermined amount of time^{40,41}. According to *Ibne Sina* *Naṭūl* is the finest remedy for reducing inflammation, restoring a body's altered temperament, strengthening the affected organ, and relieving pain. Numerous diseases of the body, such as CNS disorders (headache, amnesia, melancholia, epilepsy, vertigo, insomnia), eye disorders, musculoskeletal disorder, sinusitis, kidney disease, hepatic disease, and others, can be treated with this therapy^{8,9,10,13,24}.

Conclusion

Knee osteoarthritis is not specifically defined in Unani medicine as it is in conventional medicine. Instead, it is discussed under a broader term called "*Waja'al-Mafāṣil*,"

which includes all types of joint disorders, such as inflammatory, non-inflammatory, infectious, metabolic, and other musculoskeletal conditions. The Unani treatment approach focuses on restoring the body's natural balance, correcting the *Khilt* (humor) imbalance through methods like *Imala* (diversion of harmful material) and *Istifraagh* (evacuation of harmful material), and minimizing pain and disability. Unani treatment combines both non-pharmacological (lifestyle changes, Regimenal therapies) and pharmacological (herbal medicines) approaches. This method is considered more affordable and with fewer side effects compared to conventional medicine. Unani scholars have documented a detailed understanding of *Waja'al-Mafāṣil*, including its definition, classification, causes, and treatment methods, highlighting the careful handling of such conditions in Unani medicine despite historical limitations.

Various academic institutions are now conducting research on specific Unani treatments and therapies. A key advantage of Unani therapy lies in its use of simple regimental therapies with minimal medication, making it easy to perform, cost-effective, and free from significant side effects. These therapies not only help in preventing and controlling the disease but also greatly improve the quality of life by reducing pain and discomfort. As these treatments become more integrated into mainstream healthcare, they can offer significant benefits to society.

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