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Review Article

Tadābīr-i-Mashā'ikh (geriatric care) in Greco-Arabian (traditional) medicine: Concept, guidelines, potential geroprotective activity, and present-day relevance

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Abstract

Objective: This narrative review is done with the aim to explore the guidelines and the scientific rationale of Islamic traditional medicine for elderly care. By synthesizing information from Unani classical literature and published research work, we intend to present the potential role of Islamic traditional medicine in mitigating age-related physiological decline.

Materials and Methods: The classical literature of Islamic traditional medicine was reviewed for information on geriatric care, and the medicines prescribed for common geriatric problems. Also, leading scientific websites were searched for researches conducted on Islamic traditional medicine drugs, which provided evidence of their efficacy in age-related disorders.

Results: The main principle of geriatric care in Islamic traditional medicine is to prevent the loss of innate fluids and innate heat, and prevent the accumulation of abnormal heat and fluids. Besides, the *mufatteḥ-i-sudad* (de-obstruent) measures are given utmost importance, and they aim to remove accumulated matter, and restore the physiological processes. This is important as many disorders of old-age arise from stasis of morbid matter, or sluggish physiological processes, as observed in recent researches. Further, many medicinal foods such as fennel, honey, fig, honey, etc. are prescribed to prevent and mitigate aging problems.

Conclusion: Islamic traditional medicine offers practical, applicable, and cost-effective guidelines for elderly healthcare. With the global elderly population projected to rise significantly in the coming decades, integrating Unani principles into geriatric care could offer sustainable and culturally resonant solutions.

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Introduction

The decade 2021-2030 has been declared as the *United Nations Decade of Healthy Ageing*. This not only emphasizes the need to address the complex health concerns of the elderly in a specialized manner, but also underscores the necessity

of maximizing their functional abilities over the course of life, to improve their overall well-being (WHO 2024). The physiological changes associated with advancing age, presence of chronic diseases, and various psycho-social factors cause a gradual decline in intrinsic capacities with advancing age. Consequently, the elderly are likely to suffer from myriad health problems like increased risk of infections, immune-senescence, osteopenia, atherosclerosis, and neurodegenerative disorders, etc. (Wick et al. 2000). The progress in medical sciences over the last century has led to a remarkable increase in life-expectancy, which is postulated to continue growing in the coming decades. It is speculated that by 2050, there will be more than 70 million oldest-old people (aged > 90 years) worldwide (Fernández-Blázquez et al. 2021). This increase is likely to lead to an unprecedented number of people suffering from age-related problems. In such a scenario, there is an imperative need to take steps to prevent and delay the aging complications, and to increase the *healthspan*, besides lifespan (i.e. biological age *vs.* chronological age) (Campisi et al. 2019).

In this context, Islamic traditional medicine and other herbal medicine systems can potentially play a significant role. Unani System of Medicine (USM) is a traditional medicine system included in Indian Systems of Medicine and known by the acronym 'AYUSH' (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) (Mohanty et al. 2024). The word Unani refers to its Greek origin. The rudimentary Hellenistic medicine was subsequently organized, systematized, and developed by scholars from Muslim scholars during the medieval ages. Hence, it is referred to by various names like Persian medicine, Islamic traditional medicine, Greco-Arabian medicine in different parts of the world (Masic 2012). In Islamic Traditional Medicine (ITM), geriatric health is discussed under the term '*Tadābīr-i-Mashā'ikh*' which are a set of guidelines which include specific preventive and therapeutic measures for the elderly, besides recommendations for a healthy lifestyle (diet, physical activity, recreation, etc.) in old-age (Ibn Sinā 1593).

As the global population ages, the need for holistic and culturally rooted healthcare systems becomes increasingly vital. Islamic traditional medicine (ITM), with its rich heritage and individualized approach, offers a unique perspective on aging and geriatric care. In a recent nationwide survey Longitudinal Aging Study in India (LASI) among older adults (age ≥ 60 years, n = 31,464), it was observed that AYUSH consultation is common among older adults regardless of socio-economic factors (religion, residence and caste) (Mohanty et al. 2024). Another study in Shanghai revealed that approximately 50% of elderly preferred to use traditional medicine for cardiovascular diseases, respiratory diseases, nervous system diseases, prostatitis, cancer, and arthritis (Xin et al. 2020). Studies in industrialized countries have also revealed a growing popularity of traditional medicine in all age-groups, due to the provision of culturally-appropriate care (Ijaz et al. 2021), which might be one of the reasons of its preference among the elderly.

Contemporary researches have also substantiated that herbal medicines can be safely and effectively utilized for common geriatric health problems. For instance, cinnamon derived from Cinnamomum trees can improve lipid profile, insulin resistance, and blood pressure (Gheflati et al. 2023). Similarly, *Coriandrum sativum* L., a common herb used as culinary seasoning, has neuroprotective, antioxidant, and anti-inflammatory activity (Hosseini et al. 2021). Carvacrol, a monoterpenoid phenol present in several aromatic plants of Lamiaceae and Verbenaceae, has significant anti-neurodegenerative and memory-enhancing activity (Azizi et al. 2022).

With this background, we aimed to explore the USM literature for recommendations on care of elderly, the preventive and therapeutic measures described therein, and scientific rationale of their efficacy.

Materials and Methods

We primarily studied the ITM textbooks for information on geriatric care and the common medicinal foods and drugs prescribed in geriatric age as health-protective and preservative. In the next step, we explored scientific literature and studies for corroboration of their efficacy. The leading scientific websites PubMed, ScienceDirect, and Medline were explored for articles with the keywords '*geriatric*', '*anti-aging*', '*health-protective*' and more as per need, along with the names of the drugs. Inclusion criteria followed were: (i) Studies in which, the drugs were studied exclusively on old-age patients (age ≥ 50 years), or in which, geriatric patients were included in the test group, (ii) the drug was used in single form, rather than as part of a formulation, (iii) English language articles, (iv) published from the year 2000 onwards, and (v) studies conducted on the same part of the drug which is prescribed in USM literature. Preference was given to clinical studies and those studies in which, the drug was used in the same form as described in USM. Owing to the large number of publications, all could not be included, we preferred those which studied the drug from a broader perspective, and where the anti-senescence activity of the drug could be linked to specific phytochemicals. All botanical names were verified from The WFO Plant List (https://wfoplantlist.org/).

Results

Approach to health protection of elderly in Islamic traditional medicine*:*

In USM, aging is explained in terms of *rūḥ* (closest synonym in English-pneuma or spirit; plural-*arwāḥ*), *mizāj* (temperament), *ruṭūbāt usṭuqussiyya* or *ruṭūbāt-i-gharīziyya* (innate fluids or innate moisture), and *ḥarārat-i-gharīziyya* (*calidum innatum* or innate heat). The concepts are explained in brief.

According to Unani philosophy, *ḥarārat-i-gharīziyya* is the innate heat generated within the body by various metabolic processes (Ibn Sinā, 1879). It is also explained that the *ḥarārat-i-gharīziyya* is fortified by the *rūḥ* and sustained by *ruṭūbāt-i-gharīziyya* (innate fluids). The concept of *rūḥ* is perhaps the most enigmatic one and hence, cannot be translated into an English equivalent which conveys its complete meaning. It is similar to the concept of *qi* in Chinese medicine, *prana* in Ayurvedic medicine, and 'soul' in Arabic and Islamic cultures (Abu-Asab et al. 2013). In USM, *rūḥ* is described as a light gaseous substance which is obtained from the interaction between the air of inspiration and body humors (WHO 2022), and is vital for generation of *innate heat* (Abu-Asab et al. 2013). The *rūḥ* is unique for each system, e.g. *rūḥ-i-nafsāniyya* (psychic pneuma, the pneuma found in organs of the psychic faculty whose center is the brain), *rūḥ ḥaywāniyya* (vital pneuma, the pneuma found in organs of the vital faculty, whose center is the heart), etc. (WHO 2022). With in-depth understanding of ventilation-perfusion, it is now elucidated that respiratory gas exchange actually takes place in peripheral tissues, and the environment which facilitates this exchange, is distinctive for each tissue (West 2011). This makes it clear that the pneuma or *rūḥ* is not just the oxygen in inspired air, but the actual environment of tissues which is responsible for their vitality.

The *ruṭūbāt-i-gharīziyya*, also known as *ruṭūbāt usṭuqussiyya* (innate fluids) are created from the fluids consumed, which are subjected to various physiological processes, and form the moist part of the body. In *Kāmil aṣ-Ṣinā'ah aṭ-Ṭibbiya* (Complete Book on Art of Medicine) authored by 'Alī Ibn 'Abbās Majūsī (Haly

Abbas, 930-994 AD), *Usṭuqus* is defined as the smallest part of a substance which is indivisible. Hence, it is interpreted as 'element'. Therefore, *ruṭūbāt usṭuqussiyya* or *ruṭūbāt-i-gharīziyya* actually refers to the fluids present in tissues and organs (Majūsī 1889a). According to Ibn Sīnā (Avicenna, 980-1037 AD), the innate fluids afford protection to the innate heat, and a progressive attenuation of body moisture is responsible for senescence (Abu-Asab et al. 2013).

It is also postulated that the innate fluids decrease progressively with age, with progressive decline in innate fluids. With the decrease in innate fluids and innate heat, there is occurrence of pathological fluids and abnormal heat which are termed as *ruṭubāt-i-gharība* and *ḥarārat-i-gharība*, respectively. These abnormal fluids and heat give rise to abnormal reactions in the body, termed as *Iḥtirāq* (combustion), which produces abnormal humors, causes combustion of normal humors, and gives rise to diseases (Kausar et al. 2021). They also play a significant role in decline of health and eventual death.

The above paragraphs describe the concepts of USM regarding the causation of senescence and death. Philosophically, the interpretation and explanation of innate fluids, innate heat, pneuma, and temperament in USM differ from the interpretation of aging changes and functional decline in contemporary medicine. To bring both systems on the same platform, there have been efforts to identify aging-related biochemical markers and processes which may explain the concepts described in traditional Islamic medicine. Hence, we hereby make an attempt to correlate the Unani concepts with modern understanding.

In the present era, *ḥarārat-i-gharīziyya* is interpreted as the heat generated by mitochondrial action, which manifests as Basal Metabolic Rate (BMR). While the *ruṭūbāt-i-gharīziyya* are interpreted as intracellular and extracellular fluids (Kausar et al. 2021). The justification for this is that normal cellular metabolism generates energy in the form of ATP (adenosine triphosphate), by progressive oxidation of nutrient-sourced atoms. The exchange and uptake of nutrients across the cell membrane is dependent on the extracellular and intracellular fluids to support various pathways (Pavlova et al. 2022). This is similar to the concept of USM in which, it is stated that *innate heat* is generated within the body by fortification from inspired air (containing oxygen), and is maintained by fluids of the body. It is also estimated that the total body volume of fluids reduces to 45% of body weight in elderly as compared to nearly 65% in adult age. In comparison, the total body water in infants and children is 65-80% of their weight (Vega and Avva 2019). This reduction of fluid volume is analogous to the concept of age-related diminution of *ruṭubāt-i-gharīziyya* (innate fluids) in USM.

This is also supported by the concept of *ruṭubāt-i-gharība* (abnormal fluids) and *ḥarārat-i-gharība* (external/ abnormal heat). It is observed that some factors like dietary imbalance, high BMI (body mass index), tobacco smoking, and physical inactivity, etc. contribute to the generation of free radicals leading to oxidative stress (an exothermic process), which is parallel to the concept of *ḥarārat-i-gharība*. A high BMI, exposure to pollutants, smoking, stress, etc. are strongly associated with high oxidative stress and biomarkers of DNA damage. These conditions cause the generation abnormal constituents in body fluids, e.g. reactive oxygen species, inflammatory cells, etc. (akin to the concept of *ruṭubāt-i-gharība*) which degrade the cell environment (Shammas 2011; Kausar et al. 2021). Hence, it is accepted that as long as cellular metabolism is maintained at an optimum level to prevent cellular degradation, apoptosis, and generation of free radicals, it would prevent the generation of '*heat of catabolism*', and maintain health, in alignment with USM

concepts of health and aging (Kausar et al. 2021).

A comparative representation of the Islamic traditional medicine and conventional concepts of aging is presented in Figure 1.

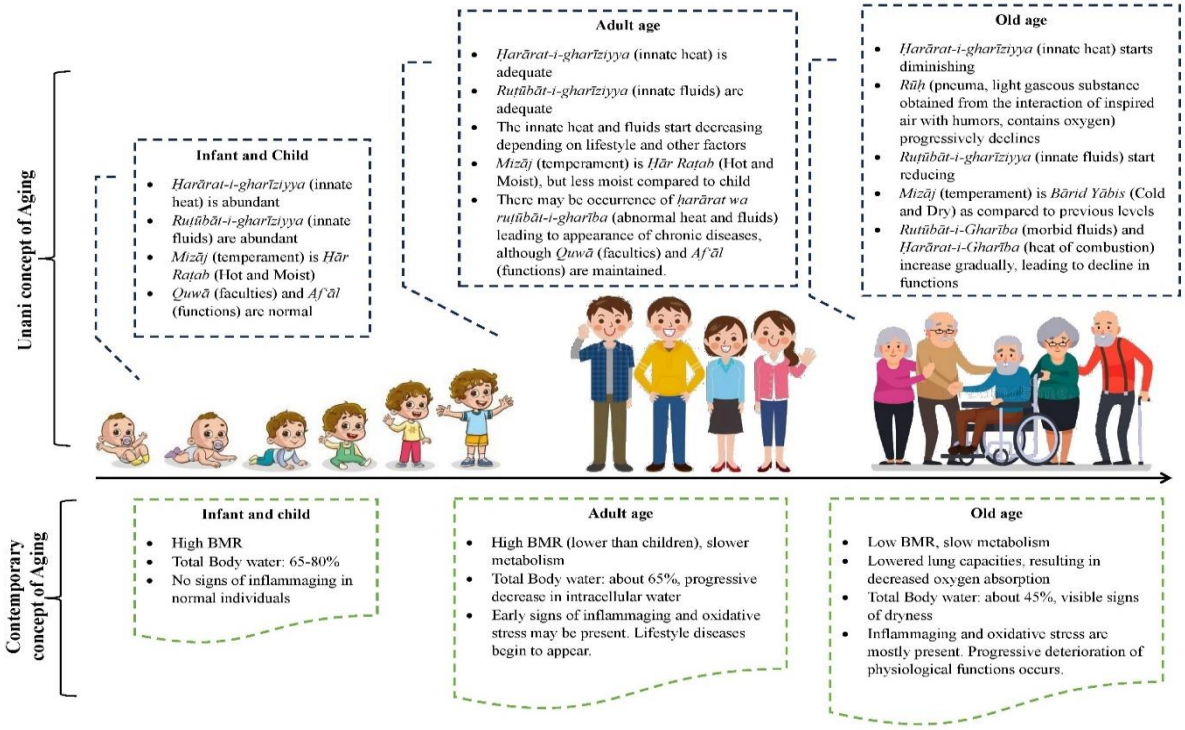

Figure 1. Comparative representation of the concepts of aging in Islamic traditional and contemporary medicine

Lifestyle and regimenal guidelines for geriatric health-preservation in ITM:

According to Islamic philosopher-physician Jurjānī, the *ḥarārat-i-gharīziyya* (innate heat) and *rutūbāt-i-gharīziyya* (innate moisture) decrease progressively with advancing age and the *mizāj* (temperament) in old age is *bārid* (cold) and *yābis* (dry). He states that the rapidity and extent of this change in temperament varies with the previous temperament, the beneficial and detrimental regime followed over time, psychological health, diseases, and occupation (Jurjānī 1878). In principle, the geriatric care in ITM is concerned with preserving of the innate heat and innate moisture, and avoiding the factors (both internal and external) which cause them to diminish. Besides, it is imperative to protect from factors which cause the generation of *ḥarārat-i-gharība* (abnormal heat), *rutūbāt-i-gharība* (abnormal moisture/ fluids), and diminution of *rūḥ* (pneuma, vital spirit) (Gruner 1973).

General guidelines:

Ibn Sīnā has enumerated the following tenets for health-maintenance in old age- (i) *tarṭīb* (producing moistness) and *taskhīn* (calefaction), (ii) increase sleep and rest, (iii) age-and health-appropriate diet, (iv) regular use of diuretics and laxatives to expel *balgham* (phlegmatic humor) through bladder and intestine, (v) softening the bowel movements, (vi) moderate massage with oils should be done followed by walking or riding, and (vii) use of perfumes which are warm in temperament (Ibn Sinā 1879).

Ghidhā (Diet): According to Moḥammad ibn Zakariyā Rāzī (Rhazes, 865-925 AD), the elderly should be given a healthy, easily digestible diet, and palatable diet (Razi 1991), which is *ḥār raṭab* (hot moist) in temperament (Baghdādī 2005). It is preferred to give small frequent meals

keeping in mind their weak digestion. Also, the foods which produce *sawda* (melancholic humor, cold-dry temperament) or *balgham* (phlegmatic humor, cold-wet temperament) should be avoided. Such as brinjal, roasted meat, or meat of animal killed by hunting. Milk is considered beneficial, unless it causes abdominal pain (Ibn Sinā 1879) or flatulence (Jurjānī 1878). According to Ibn Rushd (Averroes, 1126-1198 AD), milk should also be avoided if a person has thin/ constricted veins or inherent cold temperament (Rushd 1987). Wheat, olive oil, beetroot, *bathua* (*Chenopodium album* L. greens), spinach, fig, oxymel, and honey etc. are preferred as diet as they are easily digestible, nutritive, and prevent constipation (Majūsī 1889b; Nikhat and Fazil 2022). *Nabīdh* (fermented drink) made with de-seeded *mawīz* (*Vitis vinifera* L. fruit) (Rushd 1987), plum, and *murabba zanjabīl* (preserve of *Zingiber officinale* Roscoe. rhizome) are also recommended in classical literature of ITM (Ibn Sinā 1879).

Daily regime: It is recommended by Avicenna that the elderly should bath seven hours after sunrise, so that the temperature is moderate (Ibn Sinā 1879). After bath, *dalk* (massage) with aromatic oils such as *Roghan-i-Nargis* (*Narcissus tazetta* L. oil), *Roghan-i-Sawsan* (*Iris ensata* Thunb. oil), and *Roghan-i-'Anbar* (ambergris oil) is recommended (Jurjānī 1878). The duration and frequency of massage should be decided according to individual needs. Massage is effective in preventing nervine diseases. *Ḥammām* (Turkish bath) combined with massage is also beneficial to expel morbid substances, and is preferable over heavy physical activity. Moderate exercises should be prescribed according to general health. In ITM, physical activity is considered vital for maintaining healthy physiology. Hence even if an organ is diseased, it is recommended that individualized exercise regimen may be devised (Ibn Sinā 1879). Since the elderly have a lower resting energy expenditure, and slower clearance of morbid matter, prophylactic use of diuretics (e.g. oxymel, fresh fennel, and *Apium graveolens* L. seed), laxatives e.g. (*Pistacia atlantica* Desf. resin), and *mufatteḥ-i-sudad* (de-obstruent) medicines (e.g. *Piper nigrum* L., onion, and garlic) is prescribed at suitable intervals (Jurjānī 1878; Ibn Sinā 1879; Majūsī 1889b).

Mufatteḥ-i-Sudad (De-obstruent) measures: In ITM, a concept of *sudad* (obstruction), which is explained as any physical entity or abnormality that prevents physiological functions, or hampers the production of normal humors. Examples of physical obstruction include atherosclerosis, mucus plug in respiratory tract, constipation, calculi, etc. Factors such as slow metabolism, reduced vital capacity of lungs, and slow metabolism, etc. may also be considered *sudad* (obstruction) as they impede physiological functions (Jurjānī 1878; Ibn Sinā 1879; Tahseen et al. 2024). Since the elderly have a lower resting energy expenditure, and slower clearance of morbid matter, there is a higher chance of developing such obstructions which lead to further complications (Bautmans et al. 2022). Hence, it is recommended that prophylactic use of de-obstruent medicinal foods should be done on a regular basis.

Geroprotective activity of Islamic traditional medicine

The terms geroprotective and senoprotective are used interchangeably in medical literature. Conceptually, the term 'geroprotective' includes those agents which protect against the effects of effects of aging and delay the onset of age-related diseases (Rivero-Segura et al. 2024). While 'senoprotective' refers to the agents which act on senescent cells to prevent further deterioration (Boulestreau et al. 2024). In Table 1, we present the details of some *Ghidha-i-dawā'ī* (medicinal foods) and medicines which are prescribed under elderly care guidelines in classical Islamic traditional medicine textbooks as health preservative.

Table 1. Islamic traditional medicines recommended as anti-aging/ health-preservative in old age

Herb/ Drug	Functions described in Unani classical books	Research related to anti-aging/ senoprotective activity of the drug		
		Study design	Active ingredients responsible for the activity	Key findings
Ajwā'in (*Trachyspermum ammi* Sprague seeds, Apiaceae)	Expels morbid matter through diuresis (Rushd 1987), *mulattif* (attenuant) of morbid matter, de-obstruent, beneficial for respiratory and digestive tract (Ibn Sinā 1879)	RCT-P, *n*=98 patients on mechanical ventilation, 10 ml *T. ammi* syrup thrice a day × 10 days *vs.* placebo	Thymol and carvacrol	Test group had 72% lesser chance of developing ventilator-associated pneumonia (Ahmadipour et al. 2024)
Akhrot (*Juglans regia* L. kernel, Juglandaceae)	Laxative, promotes health in old age (Rushd 1987)	RCT, cognitively healthy elderly (63-79 years). *n*=149 *Groups*: (i) Walnut group (15% of total energy intake) (ii) Control group-normal diet, abstaining from walnuts *Duration:* 2 years	Alpha-linolenic acid (precursor to *n*-3 polyunsaturated fatty acid)	Delayed telomere shortening (p=0.079) (Freitas-Simoes et al. 2018)
Ālū Bukhārā (*Prunus domestica* L. fruit, Rosaceae)	Beneficial as diet in summers (Ibn Sinā 1879), relieves itching and uneasiness caused by heat, relieves nausea, expels *ṣafrā* (bilious humor) by laxative action (Ibn Bayṭār 1985)	Animal models of D-galactose-induced aging with dried plum as diet (10%) × 8 weeks	Polyphenols	↑Nrf2-involved antioxidant capacities, ↓Nf-κB activation through the PI3K/Akt pathway, ↓oxidative stress markers, anti-aging (Jeong et al. 2017)
Āmla (*Phyllanthus emblica* L. fruit, Phyllanthaceae)	Improves longevity, ↑cardiac health, ↑cognition, beneficial for nerves, eyes, stomach, and hair; ↓melancholic disorders (Ḥarawī 2007)	RCT-P, double blind, *n*=167 males (116 aged 45-60 years, 51 aged 22-30 years), DNA damage induced with UV-C in mononuclear cells (0.5 and 1 J/cm^2) *Test drug*: Amalaki Rasayana (an Ayurvedic preparation made with *Amla* fruit, clarified butter, and honey) *Dose:* 45 g/day on empty stomach *Duration:* 90 days	Ellagic Acid, Gallic Acid, Vitamin C, flavonoids, and tannins (emblicanin A&B)	↑DNA strand repair capacity, ↓UV-induced DNA strand break in older subjects. No adverse effects (Vishwanatha et al. 2016)
Angūr (*Vitis vinifera* L. fresh fruit, Vitaceae)	Beneficial as diet (Baghdādī 2005), nutritive, laxative (Ibn Sinā 1879)	RCT-P double-blind, elderly patients of cognitive decline (mean age 72.2 ± 4.7 years), *n*=10 *Intervention*: active grape formulation 72 g/day *vs.* placebo (polyphenol-free) × 6 months	Polyphenols	Decreased age-related metabolic decline in brain areas related to aging (anterior cingulate, (posterior cingulate and superoposterior temporal cortex) (Lee et al. 2017)
Anjīr (*Ficus carica* L. fruit, Moraceae)	Expels morbid matter by laxative action (Rushd 1987), anti-inflammatory, relieved feeling of heat, beneficial in chronic lung diseases (Ibn Bayṭār 1985)	Transgenic mice model of Alzheimer's Disease (*n*=18) *Intervention*: Fig powder (4% of diet) *vs.* placebo × 15 months	Quercetin, proanthocyanidins, minerals (copper, iron, manganese, calcium) and vitamin K	Improved cognitive and motor skills, ↓anxiety, ↑learning ability (Subash et al. 2016)
'Asal (Honey)	Laxative, general tonic (Ibn Sinā 1879; Rushd 1987)	RCT, *n*=37, 18-54 years healthy volunteers *Dose:* buckwheat honey, 1.5 g/kg body weight per day, containing 0.79 ± 0.02 and 1.71 ± 0.21 mg of phenolic antioxidants per gram in low and high antioxidant honey respectively)	Phenolics, monophenolics (4-hydroxybenzoic, 4-hydroxycinnamic acids) and flavonoids	↓Oxidative stress, ↑plasma reducing capacity in high-antioxidant honey group (Schramm et al. 2003)
Bādām (*Prunus amygdalus* Bastch kernel, Rosaceae)	Beneficial as diet (Majūsī 1889b), nutritive, de-obstruent (Ibn Bayṭār 2003)	RCT, obese (BMI 25–39·9 kg/m^2) adults, mean age 50-80 years, *n*=124 *Intervention*: Almond enriched diet (15% of total energy intake) *vs.* nut-free diet 6 days/week × 12 weeks	Mono-unsaturated fatty acids, fibre, vitamin E, and flavonoids	Trivial lengthening of telomeres in neutrophils at 12 weeks (Ward et al. 2022)
Bādranjboya (*Melissa officinalis* L., Lamiaceae)	Strengthens innate heat, exhilarant, de-obstruent of brain, beneficial for all organs (Ḥarawī 2007)	RCT-P, double blind, *n*=23 patients of mild dementia *Intervention*: 500 mg/day *M. officinalis* extract × 48 weeks	Rosmarinic Acid	Delayed progression of Alzheimer's Disease-related neuropsychiatric symptoms (Noguchi-Shinohara et al. 2020)
Chuqandar, *Silq* (*Beta vulgaris* L., Amaranthaceae)	Expels morbid matter by laxative action (Rushd 1987), laxative, attenuant, anti-inflammatory, de-obstruent for liver and spleen (Ibn Sinā 1879)	Healthy adults (*n*=13 aged 18-30 years, *n*=11 aged 50-70 years), RCT-P, double blind, cross-over *Intervention*: Nitrate-rich fresh beetroot juice 150 ml × 3 visits	Nitrates	↑plasma nitrite, ↓systolic and diastolic blood pressure, improved cardiovascular parameters, particularly in older participants, ↑cognition (Stanaway et al. 2019)

Table 1. continued

Filfil (*Piper nigrum* L. fruit, Piperaceae)	De-obstruent, may be used in moderation as diet, clears morbid matter from chest, relieves splenitis, improves appetite, analgesic (Ibn Sinā 1879)	Animal models of anxiety, *n*=228 *Intervention: P. nigrum* essential oil 5, 10, and 50 mg/kg *vs.* standard drugs *Duration:* 21 days	Limonene, sabinene, and caryophyllene	Anxiolytic, antidepressant, ↓total cholesterol, no adverse effects (Ghosh et al. 2021)
Gandum (*Triticum aestivum* L., Poaceae)	Beneficial as diet (Jurjānī 1878), useful in lung diseases (Ibn Sinā 1879)	RCT, single-blind, overweight adults (BMI 25-30 kg/m^2, 18-45 years), *n*=40 *Intervention:* wheat germ 30g *vs*. control (cornmeal) daily × 4 weeks	Vitamin B, phytosterols, tocopherols, policosanols, and polyphenols	Maintenance of gut microbiota (*Faecalibacterium*) Improved glucose homeostasis, improved fasting insulin, HOMA-IR, and HBA1c (Dotimas et al. 2024)
Īrsā (*Iris ensata* Thunb. root, Iridaceae)	Protects innate heat, cardiotonic (Ḥarawī 2007)	*In vitro*: *I. ensata* root. Extract prepared in 80% methanol	Hydroalcoholic extract, *n*-butanol fraction (containing flavonoids and phenolic acids such as ferulic acid, *p*-coumaric acid, vanillic acid, isovitexin, isomagniferin etc.)	Antioxidant, anti-bacterial (Rao et al. 2023)
Kāhū, Khas (*Lactuca sativa* L. leaves, Asteraceae)	Beneficial as diet (Baghdādī 2005), improves sleep, diuretic, produces healthy humors, relieves dysuria (Ibn Bayṭār 1986)	Mice inoculated with multiple myeloma cells *Intervention:* Cucurbitacin B 0.1 mg/kg, *i.p.*, thrice a week × 4 weeks	Cucurbitacin B (triterpenoid)	Arrested growth cycle of multiple myeloma cells, inhibition of tumor growth by multiple pathways, no host toxicity (Yang et al. 2017)(Yang et al., 2017)
Karnab (*Brassica oleracea* L. aerial parts, Brassicaceae)	Relieves constipation (Ibn Sinā 1879), promotes wound healing, relieves urticaria, analgesic, improves complexion (Ibn Bayṭār 2003)	Animal study, high-fat diet obese mice *Intervention:* Broccoli flour-supplemented diet × 4 weeks	Glucosinolates (glycolyzed into isothiocyanates)	↓Body weight, ↓liver weight, ↓fat accumulation, ↓adipocyte size and volume (Martins et al. 2022)
Kāsnī, Hindbā (*Cichorium intybus* L. aerial parts, Asteraceae)	Beneficial as diet (Baghdādī 2005), stomachic, cardiotonic, relieves palpitation, de-obstruent for liver and spleen (Ibn Bayṭār 2003)	RCT-P, cross-over, single -blind, *n*=32, untrained healthy individuals, 18-45 years (BMI 18.5–23.9 kg/m^2) *Intervention*: 100g fresh chicory juice *vs.* placebo × 7 days	Phenolic acids	Improved exercise performance, ↓exhaustion, ↑post-exercise recovery (Mao et al. 2025)
Khubbāzī (*Malva sylvestris* L., Malvaceae)	Expels morbid matter through diuresis (Rushd 1987), anti-inflammatory, relieves dryness of chest (Ibn Bayṭār 1986)	Animal study, *n*=45 mice pretreated with *M. sylvestris* flower extract 200, 400, and 600 mg/kg × 1 week, followed by concurrent 6Gy radiation × 10 days	Flavonoids, Vitamins C, E, β-carotene, enzymes (sulfite oxidase, catalase), essential fatty acids	Radioprotective effect on liver, kidney, and intestines by antioxidant and radical scavenging activity (Azmoonfar et al. 2023)
Lablāb (*Lablab purpureus* (L.) Sweet, Fabaceae)	Relieves constipation, anti-inflammatory, attenuant, beneficial for lungs and liver (Ibn Sinā 1879)	*In vitro:* HaCaT cells exposed to Ultraviolet B radiation, pre-treated with *L. purpureus* extract	Gallic acid, epicatechin, and catechin	↓Oxidative stress, prevention of DNA damage, no toxicity (Diniyah et al. 2020)
Nakhūd (*Cicer arietinum* L. kernel, Fabaceae)	Beneficial as diet (Majūsī 1889b)	(i) Acute study (n=19, age < 70 years, healthy participants, randomized), Intervention: meals of chickpea, wheat, or bread × 2 weeks (ii) Long-term study (n=19, randomized cross-over trial), Intervention: chickpea or wheat-based food × 6 weeks each	Fiber	↓Plasma glucose, ↓plasma insulin, no change in insulin sensitivity (Nestel et al. 2004)
Nārdīn (*Nardostachys jatamansi* (D.Don) DC., Caprifolaceae)	Anxiolytic, sedative, tranquilizing, anti-hypertensive (Bhat and Malik 2020)	RCT-P, single-blind, *n*=40, 35-70 years, patients of stage-I hypertension *Intervention*: *N. jatamansi* powder 3 g/day in 3 divided doses *vs.* placebo × 4 weeks	Sesquiterpene (jatamansone), flavonoids, and polyphenols	Significant reduction in systolic and diastolic blood pressure as compared to placebo group ($p<0.001$), no adverse effects (Bhat and Malik 2020)
Pālak, Isfānākh (*Spinacia oleracea* L. aerial parts, Amaranthaceae)	Beneficial as diet (Baghdādi 2005), easily digestible, nutritive, laxative, anti-inflammatory, expels morbid matter from lungs (Ibn Bayṭār 1985)	RCT-P, double-blind, *n*=45 healthy adults, 50-75 years (men and post-menopausal women), BMI < 32 kg/m^2 *Intervention:* capsules of *S. oleracea* aqueous extract *vs.* placebo *Dose:* 2 g/day in 4 divided doses × 12 weeks	Nitrates, amino acid derivatives (pipecolic acid)	Improved muscle strength, range of movement in knee joint, no adverse events (Pérez-Piñero et al. 2021)

Table 1. continued

Parsiāoshāṉ (*Adiantum capillus-veneris* L., Pteridaceae)	De-obstruent of respiratory tract (Jurjānī 1878; Ibn Sinā 1879)	Animal study, *n*=20 healthy wistar rats exposed to 3-week hypoxia and high-intensity exercise *Intervention: A. capillus-veneris* extract 500 ml/ kg weight daily after 3 weeks of hypoxia	Flavonoids, phenolics, and terpenoids	Antioxidant, improvement in respiratory surface damage caused by chronic hypoxia, ↓inflammatory and apoptotic activity (Yadegari et al. 2019)
Rāzyānaj (*Foeniculum vulgare* Mill., fresh seeds, Apiaceae)	Expels morbid matter through diuresis (Majūsī 1889b), de-obstruent, relieves gastritis and chronic fevers (Ibn Sinā 1879)	*In vitro* and *in vivo*: normal human dermal fibroblasts *Intervention: F. vulgare* seeds ethyl alcohol extract 0.1% and 1% (concurrent with Ultraviolet B exposure), oral use in animals	Chlorogenic acid, ferulic acid, and rutin	↑Collagen, elastin, and antioxidants; ↓phosphorylation of extracellular signal-regulated kinase (Sun et al. 2016)
Roghan-i-Zaytūn (*Olea europaea* L. oil, Oleaceae)	Laxative, nervine tonic (IH 2004), analgesic, anti-aging (Baghdādī 2005; Ibn Sinā 1879)	RCT, prospective, *n*=1002, patients of coronary heart disease, age 20-75 years *Intervention:* Mediterranean diet (with 30 g Olive oil/ day) *vs.* low-fat diet	Vitamin E	Protection against shortening of leukocyte telomere length, ↓oxidative stress, ↓cellular senescence (Cicero et al. 2008)
Sīr (*Allium sativum* L. bulb, Amaryllidaceae)	De-obstruent, may be used in moderation as diet (Ibn Sinā 1879)	RCT-P, triple-blind, *n*=77 patients of grade-I hypertension *Intervention:* Extract of aged *A. sativum extract* 250 mg/day (containing s-allyl-cysteine 0.25 mg) *vs.* placebo × 12 weeks	S-allyl-cysteine	↓Blood pressure, ↑blood nitric oxide, ↑antioxidant activity, ↓uric acid (Serrano et al. 2023)
Tukhm-i-Karafs (*Apium graveolens* L. seeds, Apiaceae)	Expels morbid matter through diuresis (Rushd 1987), stomachic, anti-flatulent, de-obstruent for liver and spleen, relieves shortness of breath (Ibn Bayṭār 2003)	RCT-P, double-blind, *n*=36 patients of diabetes mellitus type-2 *Intervention:* Fresh celery powder 750 mg/day *vs.* placebo × 12 weeks	Luteolin and apigenin	↓Body fat percentage, ↑insulin, ↓malondialdehyde (Mohsenpour et al. 2023)
Tukhm-i-Qurṭum (*Carthamus tinctorius* L. seeds, Asteraceae)	Expels morbid matter by laxative action (Majūsī 1889b; Rushd 1987) clears chest, laxative (Ibn Sinā 1879)	RCT-P, *n*=67 patients of metabolic syndrome, 30-65 years, BMI ≥ 25 kg/m^2 *Intervention: C. tinctorius* seed oil 8g/day *vs.* placebo × 12 weeks	Phenolic compounds and polyphenols	↓Abdominal obesity, blood pressure, liver enzymes, ↓insulin resistance (Ruyvaran et al. 2022)
Turanjabīn (*Alhagi maurorum* Medik. exudate, Fabaceae)	Laxative (Baghdādī 2005), improves memory, relieves thirst and burning sensation in acute fevers (Ibn Bayṭār 1985)	Animal models of lead toxicity, *n*=40 *Intervention*: *A. maurorum* ethanol extract 300 mg/kg with concurrent lead acetate 100 mg/kg × 3 months	3-methyl-2-(2-oxopropyl) furan, flavonoids, and phenols	Reversal of lead-induced hepatoxicity, neurotoxicity; antioxidant, restoration of brain dopamine level, anti-apoptotic in liver and brain (Saber et al. 2022)
Zanjabīl (*Zingiber officinale* Roscoe rhizome, Zingiberaceae)	*Murabbā* (preserve) of the rhizome may be used as diet in moderate amount (Jurjānī 1878)	RCT-P, double-blind, patients of diabetes mellitus type-2, 20-80 years, HbA1c 6-10%, on oral hypoglycemics *Intervention*: *Z. officinale* rhizome powder 1.2g /day *vs.* placebo × 90 days	Gingerols (6-gingerol, 10-gingerol, 6-shogaol)	↓Fasting blood sugar, total cholesterol and insulin resistance (Carvalho et al. 2020)
Zūfā (*Hyssopus officinalis* L., Lamiaceae)	De-obstruent of respiratory tract (Jurjānī 1878; Ibn Sinā 1879)	Asthmatic mice, *n*=32 *Intervention*: *H. officinalis* aqueous extract 0.04 g/10 g once a day × 8 days	Aqueous extract	↓Immunoglobulin G and E, ↓eosinophils in bronchoalveolar lavage fluid, anti-inflammatory and antioxidant (Ma et al. 2014)

Discussion

Related supporting research on Islamic traditional medicine for common geriatric problems

In Table 2, we present important findings from some clinical research studies conducted on Islamic traditional medicines in common geriatric conditions. In this section, we included those studies which were either conducted exclusively on geriatric patients, or those which included patients from the geriatric age-group. From the results of these studies, it is evident that Islamic traditional medicines were effective against various age-related conditions such as hypertension, diabetes, anorexia, irritable bowel syndrome, and many others. No adverse effects were reported in any of the studies.

Research areas to be explored further

There is a plethora of information regarding aging changes, and an even larger number of researches on various measures which may potentially prevent or delay aging changes. In this context, the measures for geriatric care described in ITM are simple, practically applicable, and gentle on the individual. However, some fundamental concepts may be explored further to shed deeper insights into the unique concepts of ITM :

The concept of *rūḥ*

The concept of *rūḥ* (pneuma) in ITM states that *rūḥ* is the gaseous substance which is formed when inspired air interacts with tissue environment, and hence, it is unique for each organ (Ibn Sinā, 1879). The parallel concept in conventional medicine includes oxygen and other gases which make up the tissue environment and are necessary for their viability. It is also established that any disruption in the tissue environment can cause cell damage and death by altering permeability of cells, disruption of homeostasis, and several other mechanisms (Mirchandani et al. 2024), which are implicated in the aging process. In this context, several drugs have been described in ITM which can fortify the *rūḥ*. For instance, it is mentioned by Ibn al-Bayṭār (1197-1248 AD) that *Mūmiā* (*Salājīt*, *Asphaltum*, mineral pitch) can strengthen the *rūḥ* (Ibn Bayṭār 2003). However, there is a lack of research on its role as anti-aging and in elderly care. Besides, the mechanism and extent to which the fortification of *rūḥ* can help in retarding the progression of aging is yet to be understood empirically. Hence, the exploration of this concept can provide fresh insights to geriatric studies.

The concept of *ḥarārat-i-gharīziyya* (innate heat) and *ruṭubat-i-gharīziyya* (innate fluids)

The concept of innate heat and innate fluids is also one of the fundamentally-important concepts in ITM, which forms the foundation of the whole process of aging. It is explained that the innate fluids (which encompasses all fluids of the body, including inter- and intracellular fluids) preserve the innate heat, which is responsible for life. The innate heat, in turn, is dependent on *rūḥ* for its fortification. Many Unani drugs have been described which protect the innate fluids, and prevent the build-up of morbid substances, thereby preventing the generation of abnormal fluids and abnormal heat. For instance, *Sakbīnaj* (*Ferula persica* Willd., Apiaceae) (Ibn Bayṭār 1999) and Musk (Ibn Bayṭār 2003) are described as drugs which strengthen the innate heat. Although the anti-microbial, anti-cancer, and anti-inflammatory activity of *F. persica* has been studied on scientific lines (Sattar and Iranshahi 2017), the gero-protective activity has not been explored. From the Unani standpoint, if any medicine can maintain an ideal level of innate heat and fluids, it may be able to mitigate nearly all adverse effects of aging including aging itself (Nikhat and Fazil 2024). Hence, it is a feasible and interesting area of research in geriatric care.

Table 2. Clinical studies on Islamic traditional medicine and therapies against common geriatric problems

Disease/ Condition under study	Study design	Study sample	Intervention	Main results	Reference
Immuno-compromized subjects	RCT-P, double blind	*n=30*, age ≥ 60 years	*Tiryāq-i-Wabā'ī* [Composition: *Ṣibr* (*Aloe barbadensis*), *Za'frān* (*Crocus sativus*), *Mur* (*Commiphora myrrh*), ratio 2:1:1] *Dose:* 500 mg thrice a day *vs.* same dose of placebo (roasted wheat flour) *Duration*: 45 days	Increased TLC, ALC, CD4 ($p < 0.001$), CD8 count	(Nigar and Itrat 2013)
Healthy elderly volunteers for cognition and memory	RCT-P, double blind	*n=40*, mean age 55.8 ± 0.57 years (Group-A), 55.9 ± 0.65 years (Group B)	*Shownīz* (*Nigella sativa* L. seed) powder 500 mg *b.i.d. vs.* placebo (*Psyllium* seed husk) *Duration*: 9 weeks	Improvement in logical memory, Rey-Osterrieth complex figure test, recall, Stroop test ($p < 0.05$)	(Bin Sayeed et al. 2013)
Dyslipidemia	RCT-S	*n=40*, 30-60 years	*Ma'jūn Sīr 'Alwī Khān* (a Unani pharmacopeial formulation) *vs.* Atorvastatin *Duration:* 60 days	Decreased lipid profile, improved quality of life	(Quamri et al. 2021)
Cardiovascular risk factors	RCT-S	*n=40*, 18-65 years	*Arjun* (*Terminalia arjuna* (Roxb. ex. DC.) Wight & Arn.) bark powder 5g *b.i.d. vs.* Amlodipine (5 mg) and Atorvastatin (10 mg) *Duration:* 8 weeks	Improvement in Lipid profile, BP, BMI in both groups ($p<0.001$), better toleration of test drug as compared to control drugs	(Saleem et al. 2022)
Hypertension Stage-II	RCT-S	*n=60*, 18-65 years	Hydroalcoholic extract (50%) of 5 Unani drugs [*Asrol* (*Rauvolfia serpentina* Benth. ex Kurz), *Asgandh* (*Withania somnifera* (L.) Dunal), *Sankhāholī* (*Evolvulus alsinodes* Kuntze), *Parsiāoshān* (*Adiantum capillus-veneris* L.), *Filfil siyāh* (*Piper nigrum* L.)] 1100 mg daily in two divided doses *vs.* Telmesartan 40 mg once daily *Duration*: 3 weeks	Significant reduction of blood pressure ($p-0.001$), no adverse effects	(Siddiqui et al. 2024)
Hypertension	RCT-S	*n=57*, 18-60 years	*Sankhāholī* (*Evolvulus alsinoides* L.) hydroalcoholic extract, 630 mg daily *vs.* Ramipril 5 mg once daily *Duration:* 6 weeks	Reduced blood pressure; significant decrease in inflammatory markers of primary hypertension (hsCRP, IL-6), as compared to standard drugs	(Binth Siraj et al. 2024)
Essential Hypertension (Stage-I)	RCT-P	*n=40*, 35-70 years	*Nārdīn* (*Nardostachys jatamansi* (D.Don) DC) root powder 1g thrice daily *vs.* placebo (roasted wheat flour) *Duration*: 4 weeks	Reduction in blood pressure as compared to control group ($p<0.001$)	(Bhat and Malik 2020)
Diabetes Mellitus Type-2, , HbA1c > 6.5	RCT-P	*n=40*, age 35-65 years	*Pakhānbaid* (*Bergenia pacumbis* (Buch.-Ham. ex D.Don) C.Y.Wu & J.T.Pan) 4g per day *vs.* placebo *Duration*: 8 weeks	Decrease in blood sugar and glycated haemoglobin, improved quality of life, no adverse effects	(Nizamudeen et al. 2024)
Post-stroke depression	RCT-P, double blind	*n=39*, mean age 49.15 ± 8.29 (test group), 49.26 ± 13.32 (control group)	*Nārdīn* (*Nardostachys jatamansi* (D.Don) powder 3g per day *vs.* placebo (roasted wheat powder) *Duration*: 6 weeks	Reduction in Hamilton Depression Rating Scale ($HDRS_{17}$) score ($p < 0.001$)	(Bhat and Ahmad 2023)
Anorexia	SA-OLCT	*n=95*, 19-65 years	*Ḥabb-i-Ḥiltīt* [Composition: *Zanjabīl* (*Zingiber officinale* Roscoe), *Ḥiltīt* (*Ferula foetida* Regel), *Tankār* (Borax), *Namak-i-Sang* (Rock salt), 500 mg *b.i.d.* *Duration:* 14 days	Improved appetite, increased body weight, no adverse effects	(Anwar et al. 2022)
Dyspepsia	SA-OLCT	*n=95*, 18-50 years	*Sufūf-i-Tabkhīr* [Composition: *Bādiyān* (*Foeniculum vulgare* Mill.), *Kishnīz* (*Coriandrum sativum* L.), *Ṭabāshīr* (*Bambusa bambos* (L.) Voss), *Hīl Khurd* (*Elettaria cardamomum* (L.) Maton)] 6 g + *Arq-i-bādiyān* (*Foeniculum vulgare* Mill. distillate) 60 ml, *b.i.d.* *Duration*: 28 days	Decreased epigastric pain, heartburn, and postprandial fullness ($p < 0.001$)	(Mobeen and Hakeem 2023)
Knee osteoarthritis	Parallel group RCT	*n=60*, mean age: 51.53 ± 1.658 years (test group), 53.27 ± 1.981 years (control group)	Test group: application of 2 leeches on the knee joint every week once a week + *Qurṣ Mafāṣil Jadīd* [Composition: *Sūranjān Talkh* (*Colchicum luteum*) 25g, *Chob zard* (*Curcuma longa*) 25g, *Gond Kīkar* (*Acacia arabica*) 5g] 500 mg *b.i.d.* Control group: *Qurṣ Mafāṣil Jadīd* *Duration:* 28 days	Decreased pain, swelling, improved range of motion, decreased CRP and ESR in test group ($p < 0.0001$)	(Shiffa et al. 2013)
Knee osteoarthritis	RCT	*n=40*, 30-65 years	*Dalk-i-Layyin Kathīr* (soft and prolonged massage) with *Roghan-i-Bābūna* (*Matricaria chamomilla* L. oil) *vs. Ḥijāma bilā Sharṭ* (dry cupping), alternate day for 15 minutes *Duration*: 20 days	Improvement in both groups ($p < 0.001$), no significant inter-group difference ($p>0.05$)	(Islam et al. 2021)

The concept of sudad (obstruction) and de-obstruent drugs

The concept of *sudad* (obstructions) is also a clinically-relevant and important topic of research. Apart from physical obstructions like calculi, atherosclerosis, etc., the slowing-down of processes is also considered a type of obstruction in ITM. Therefore, prophylactic de-obstruent measures are given utmost importance in health preservation of elderly (Jurjānī 1878; Nikhat and Fazil 2023). In conventional researches, it is observed that there is a gradual deterioration and slowing-down of physiological processes with age. For instance, mitochondrial dysfunction, altered intercellular communication (Keshavarz et al. 2023), slow motorneuron discharge rates (Orssatto et al. 2022), immune dysfunction, (Sharma and Goodwin 2006), and suppression of fatty acid oxidation and oxidative phosphorylation (Elmansi and Miller 2024), all of which are being explored as potential targets of anti-aging therapies. In ITM, many drugs described as having de-obstruent action have demonstrated anti-aging activity in scientific studies (Table-1). Hence, the de-obstruent measures in USM ought to be explored further.

Aging is a physiologically-orchestrated phenomenon characteristically associated with a gradual decline in physiological functions. It is imperative to understand that *aging* (the process of getting older, which starts from birth) is different from *senescence* (process of somatic deterioration at older age). Aging is inevitable, but senescence and its complications can be controlled (Wick et al. 2000). In the classical literature of ITM, strong emphasis has been placed on two measures which have the potential to delay the unwanted effects of aging. First, to keep the body free of morbid substances, including preventing an excess build-up of normal nutrients. Second, to prevent deterioration of the innate heat and innate fluids (Majūsī 1889a). In the current biomedical understanding, this translates to keeping the body free of pathological substances and over-nutrition; along with maintenance of normal metabolism and adequate tissue hydration for normal functioning of all systems. If observed closely, these factors occupy central importance in nearly all pathways which lead to progressive deterioration of physiological functions (Wick et al. 2000). Hence, with further researches, the application of Unani *Tadābīr-i-Mashā'ikh* (elderly care measures) can potentially provide a cost-effective method to delay and mitigate the adverse effects of senescence.

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We have not used any AI tools or technologies to prepare this manuscript.

Author contributions

SN: Conceptualization, methodology, investigation, formal analysis, and drafting the manuscript; MF: Visualization, and writing - review & editing, supervision. Both authors read and approved the final manuscript.

Abbreviations

ALC: Absolute Lymphocyte Count; ATP: adenosine triphosphate; AYUSH: Ayurveda, Yoga, Unani, Siddha, and Homeopathy; *b.i.d.*: *bis in die* (twice a day); BPH: Benign Prostatic Hypertrophy; CD4:

cluster of differentiation 4; CRP: C-reactive proteins; DNA: Deoxyribose nucleic acid; ESR: Erythrocyte Sedimentation Rate; GSH-Px: glutathione peroxidase; HbA1c: glycated haemoglobin; HOMA-IR: Homeostatic Model Assessment of Insulin Resistance; ITM: Islamic Traditional medicine; MDA: Malondialdehyde; PAMRP: Pro-aging metabolic reprogramming; PGF: pomegranate flower; PPAR: Peroxisome proliferator-activated receptors; RCT: Randomized Controlled Trial; RCT-P: Randomized Placebo-Controlled Clinical Trial; RCT-S: Randomized Standard-Controlled Clinical Trial; SA-OLCT: Single-arm open-label clinical trial; SOD: superoxide dismutase; TLC: Total Leukocyte Count; USM: Unani System of Medicine

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