



Review Article

Persian medicine recommendations for the prevention of pandemics related to the respiratory system: A narrative literature review

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ABSTRACT

Background: Pandemics of infectious diseases have long been regarded as societal challenges. This study aimed to summarize the theories of Persian medicine for controlling respiratory disease-related pandemics and to compare these theories with the findings of modern medicine.

Methods: We searched the classic medical reference books of the 9th to 19th centuries for the terms 'polluted air' and 'pandemic', and we searched 4 databases (PubMed, Google Scholar, Science Direct, and Scopus) with the keywords 'COVID-19', 'pandemic', 'history', and 'prevention programs'. The results were collected and subjected to content analysis.

Results: From the point of view of traditional Iranian physicians, disease prevention is primarily possible by avoiding pathogenic factors. As a secondary solution, reducing one's susceptibility to the disease is crucial; this can be achieved through cleansing the body and strengthening the mood, reducing food intake, decreasing the internal humidity, disinfecting the house with herbal fumigation, and making use of pleasant aromas. Some of these recommendations are reaffirmed by modern research.

Conclusion: Persian medicine techniques may be preventive during respiratory, influenza-like disease pandemics. However, rigorous studies are needed to confirm this hypothesis.

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1. Introduction

Throughout history, many reports of pandemics have been recorded, with respiratory infections such as influenza being among the most notorious and common.^{1,2} In the earliest documents, historians reported the occurrence of an influenza-like pandemic in Greece in approximately 412 BC.^{2,3} In each of the recent centuries, an average of two to three influenza pandemics have occurred worldwide.⁴

The geographic and political conditions of Iran have led to its involvement in a range of pandemics throughout its history.⁵ Due to Iran's involvement in most global pandemics, related topics, especially respiratory infectious diseases, have remained prominent aspects of Persian medicine (PM). Accordingly, Persian physicians are familiar with respiratory, influenza-like pandemics, discussed under the title 'polluted air' (PA; *hāwāy-e vābāi*) in reference books.⁶ Avicenna considered *vābā* to mean a general disease, i.e., the pandemic-like spread of a disease.⁷ In fact, under PA conditions,

various diseases such as smallpox, typhoid, plague, and various fevers and abscesses arise; symptoms such as fever, dyspnea, palpitations, and syncope results in a considerable number of deaths in the community.⁸ Regarding pandemic respiratory infections with specific symptoms, terms such as 'polluted wind', 'postnasal drip related to common disease', 'fever related to common disease', and 'cough related to common disease' have been used in the Persian references.^{9,10}

The coronavirus disease 2019 (COVID-19) pandemic has affected most countries across the world. The symptoms induced by SARS-CoV-2 virus are vastly similar to those of other viral infections of the respiratory tract (e.g., influenza).¹¹ The person-to-person transmission of this virus has facilitated the rapid, global spread of the disease.^{12,13} Considering the fact that an effective modality of treatment for this newfound ailment has yet to be discovered, there is a significant need for preventive policies and the utilization of experiences from traditional medicine.¹⁴

The present study aimed to review the theories, experiences, and views of Persian medicine scholars and compare them with the findings of modern medicine for controlling respiratory disease pandemics.

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2. Methods

In this narrative systematic review, the credible books of Persian medicine published between the 9th and 19th centuries AD, including *The Canon of Medicine* (Avicenna), *Al-Mansūrī on Medicine* (*Al-Mansūrī Fi al-Tibb*; Rhazes), *A Guide to Medical Learners* (*Hidayat al-Muta'allemīn Fi al-Tibb*; Al-Akhawyni), *Zakhireye Khwarazmshahi* (Gorgani), *The Book of Experiences* (*Kitab al-tajarib*; Rhazes), *The Greatest Elixir* (*Exir Azam*; Hakim Azam Khan), *Tohfāt Al-mo'menīn* (Hakim Mu'min), *Summary of Wisdom* (*Kholaseh al-Hekmah*; Aghili Shirazi), and *Mofarah Al-Gholoob* (Hakim Arzani), were searched for the terms 'pandemic' (Persian: *Vābāī*) and 'polluted air' (Persian: *hāwāy-e vābāī*) and all their equivalents in the Persian and Arabic languages.

In addition, the main medical databases, i.e., PubMed, Science Direct, Scopus, and Google Scholar, were searched for the terms 'COVID-19', 'pandemic', 'history', and 'prevention programs'. Data published prior to April 2020 were collected, and modern and traditional information was analyzed and compared.

First, we gathered all notes and documents to form a comprehensive file on a computer. Then, we reviewed the findings several times and made notes about relevant information. We made some initial codes to categorize the data into historical, preventive and incoherent groups. Subsequently, the recurring codes and items were combined into cohesive themes presented in text and tables.

3. Results

We gathered relevant data from the historical references and from a total of 1342 papers indexed in the electronic databases to form a one hundred twenty three-page Microsoft Word document. After a thorough review of the searched material, we finally reached a six-page dataset composed of the most applicable information from both the classical books and 64 novel articles.

In PM references to control PA conditions or the occurrence of pandemics, numerous recommendations have been issued for health preservation management via the six essential principles as well as the nonessential principles.^{15,16} However, Persian physicians consider distancing from the disease area and self-quarantining at home to comprise the first and foremost preventive strategy.¹⁷ Subsequent to the six essential principles, other factors, such as showering and oiling the body, are considered nonessential principles that also have significance in pandemic disease prevention.¹⁵

The first and foremost method to prevent the incidence of disease during pandemics is to move from the focus of the disease to healthy regions. However, as a secondary solution, it is necessary to self-quarantine in closed environments such as the house and to correct the internal environment.¹⁷ Among the principles of correcting the internal environment is the removal of moisture using the incense of plants such as purple nutsedge (*Cyperus rotundus*), frankincense (*Boswellia carterii*), myrtle (*Myrtus communis*), Damask rose (*Rosa damascene*), sandalwood (*Santalum spp.*), and vinegar.^{7,15} Another measure to correct the internal environment is to dissolve the *Ferula asafoetida* in vinegar and spray it several times inside the house and at its entrances (e.g., doors and windows).¹⁷ Avicenna also introduced the use of vinegar as a deterrent of PA.¹⁵

Hunger and thirst are harmful to both healthy people and those afflicted with pandemic disease, as they augment the effect of PA.¹⁷ On the other hand, drinking plenty of fluids is not recommended in PM.¹⁵ In addition to reducing food intake (as the most prominent food strategy), measures such as increasing the number of meals, reducing the size of each meal, and consuming easily digestible foods should be considered.^{18–20} Eating sour and drying foods such as sour grape soup, pomegranate soup, sumac soup, and vinegar

soup is also beneficial.^{17,18} Another recommendation is to consume fragrant fruits such as apples (*Pyrus malus*) and quinces (*Cydonia oblonga*) as well as sour/astringent fruits such as pomegranates (*Punica granatum*).^{8,18,19}

In PM, during epidemics, high-intensity exercise or activities that result in shortness of breath are considered harmful and are therefore prohibited.^{7,19} The balance of evacuation (excretion of waste products) and retention (preservation of beneficial substances) should be maintained in such a way that while excess moisture is eliminated, weakness and reduction of vital force do not occur. Generally, sleep should be considered in terms of two aspects. The first is the sleep duration, which should be moderate, i.e., between 6 and 10 hours per day. The second is the timing of sleep, such that one should refrain from remaining awake through the night, sleeping late, or sleeping during the day. Avoiding mental conditions such as sadness, anxiety, emotional stress and anger can be effective in preventing the incidence of disease during PA.¹⁸ Refraining from obsession is also essential and necessary.¹⁹

It is highly remarkable that, as evident in Table 1, the PM recommendations maintain a high level of agreement with the WHO guidelines for dealing with COVID-19.

There is some current evidence in support of the anti-infective properties of the Persian medications recommended for preventing PA in traditional resources (see Table 2). Current sleep research and guidelines also confirm the beneficial effects of adequate sleep on the immune system.²⁷ The necessity of social distancing during the peak of a pandemic, which includes restrictions on exercise (particularly team sports), has been reaffirmed recently.²²

Furthermore, the incense of agents such as vinegar and sandalwood can minimize ambient humidity. Research has shown that the COVID-19 spreads more prominently in areas with a humidity of 47–49%.²⁸ The positive impact of reduced fear, stress and anxiety on the body's immunity and physical strength has also been confirmed in recent studies.²⁹

4. Discussion

After examining and analyzing the findings of the present study, it can generally be inferred that PM considers the issue of prevention in the context of pandemics from two perspectives. First, it considers the etiological agent of the disease and recommends its avoidance by refraining from the area of outbreak or self-quarantining at home. In fact, this is the first and foremost recommendation of Persian physicians. The second substantial factor that should be considered is the background and susceptibility of individuals to the disease, with the risk of affliction being largely minimized if the suggested measures are taken. It should be noted that this susceptibility is broader than the issue of comorbidities mentioned in modern medicine because, from the perspective of PM, individuals who appear to lack any underlying conditions can be quite susceptible to infectious diseases. This is consistent with recent studies that have reported healthy subjects becoming severely affected by COVID-19.

Among the six essential principles, Persian physicians have placed greater emphasis on nutrition, air, and the excretion of waste products from the body, causing weight loss. Hence, obesity can increase the risk of acquiring influenza disease in the community.⁴⁶ Novel studies have demonstrated that calorie restriction (CR) affects various parts of the immune system and improves its function.⁴⁷ Currently, many studies have hypothesized that the olfactory system influences the immune system.⁴⁸ Accordingly, essential oils are also used in aromatherapy given their antimicrobial, anti-inflammatory, and immune system-enhancing properties.^{49–51} Garlic is one agent that boosts the functioning of the immune system in such a way.⁴⁴ Another example is the onion,

Table 1

Comparison of the Persian medicine recommendations for the prevention of pandemics with the guidelines of the World Health Organization related to COVID-19

Persian medicine recommendations			World Health Organization guidelines
Essential principles	Air	Distance oneself from the disease area; self-quarantine ¹⁷ ; eat things like the purple nutsedge and frankincense ^{7,15} ; spray vinegar and sour grape juice at home ¹⁷ ; make the house smell pleasant with rose water and sandalwood. ⁸	Observe social distancing and personal hygiene (frequent hand washing, use of gloves and masks); trace suspicious cases. ^{21–23}
	Eating and drinking	Reduce food intake ¹⁹ ; consume antidotes ⁷ ; eat garlic, onion, and vinegar ¹⁷ ; consume sour foods ^{17,18} and fragrant fruits such as apples and quinces. ¹⁸	Wash and disinfect food products (no specific diet); avoid drugs and alcohol. ^{21,23}
	Activity and rest	Avoid relatively high-intensity exercise ¹⁹ ; avoid excessive rest/immobilization. ¹⁸	Avoid group exercise/sport; take up appropriate, regular exercise during quarantine. ^{22,23}
	Evacuation and retention	Consume stool softeners such as the <i>Terminalia chebula</i> and <i>Cassia fistula</i> ¹⁹ ; avoid excessive sexual intercourse. ¹⁸	–
	Sleep and wakefulness	Moderate sleep duration; sleep early at night and wake up early; avoid daytime sleep. ¹⁹	Have adequate rest and regular sleep. ²²
	Psychological and mental reactions	Avoid harmful mental states such as sadness, fear, anxiety, stress and obsession. ^{18,19}	Reduce stress in the home environment. ^{22,23}
Nonessential principles	Olfaction	Use perfume ¹⁵ ; vapor bath and inhale the fragrances of vinegar, garlic, onion, and bergamot. ^{17,24}	–
	Showering	Avoid excessive showering with hot water. ^{25,26}	–
	Embrocation	Apply suitable oils to the body. ¹⁹	–

Table 2

Therapeutic effects of some Persian herbal medicines recommended in the prevention and treatment of infectious diseases and the supporting evidence

Scientific name	Common name	Traditional name	Route of consumption	Supporting evidence
<i>Cyperus rotundus</i>	Purple nutsedge	Sád	Fumigation	Antimicrobial effect against six important pathogens ³⁰
<i>Boswellia carterii</i>	Frankincense	Kondor	Fumigation	Suppression of Influenza virus (H1N1) infectivity by essential oil in a dose-dependent manner <i>in vitro</i> ³¹
<i>Myrtus communis</i>	Myrtle	Mürd	Fumigation	Treatment of herpes simplex infection by essential oil in animal model ³²
<i>Rosa damascene</i>	Damask rose	Várd	Fumigation	Antimicrobial activity of oil against a large number of Gram positive and Gram negative bacteria, yeast and filamentous fungi ³³
<i>Santalum spp.</i>	Sandalwood	Sandal	Fumigation	Antibacterial activity against Gram-negative strains <i>in vitro</i> ³⁴
<i>Ferula asafetida</i>	Asafetida	Heltit	Inhalation	Antimicrobial activity against five different bacterial strains <i>in vitro</i> ³⁵
<i>Berberis vulgaris</i>	Barberries	Zereshk	Oral	Effect against <i>Vibrio cholerae</i> and <i>Escherichia coli</i> diarrhea; possible use as a mild expectorant during the treatment of chronic airway diseases ³⁶
<i>Pyrus malus</i>	Apple	Sīb	Oral	Anti-inflammatory effect on mucous membranes, esp. of the nose or throat (Anticatarrhal) ³⁷
<i>Cydonia oblonga</i>	Quinces	Beh	Oral	Antibacterial effect of quince extracts <i>in vitro</i> and <i>in vivo</i> ³⁸
<i>Punica granatum</i>	Pomegranates	Ānār	Oral	In vitro and in vivo antibacterial activity of the peel ³⁹
<i>Rheum ribes</i>	Syrian rhubarb	Rīvās	Oral	Antibacterial activity of the ethanol, aqueous, and organic extracts of the root ⁴⁰
<i>Cinnamomum camphora</i>	Camphor	Kāfūr	Oral	Reducing effect on nosocomial infections in a hospital setting ⁴¹
<i>Terminalia chebula</i>	Myrobalan	Hālīleh	Oral	Inhibiting effect on influenza A virus infections ⁴²
<i>Cassia fistula</i>	Amaltas	Folūs	Oral	Antibacterial and antifungal activity ⁴³
<i>Allium sativum</i>	Garlic	Sīr	Inhalation	Antimicrobial and immune system-enhancing properties ⁴⁴
<i>Allium cepa</i>	Onion	Pīyāz	Oral/Inhalation	Decreases obesity and subsequently reduces obesity-related immune disorders ⁴⁵

which should be eaten or inhaled during steam therapy according to a PA-related recommendation of PM.

As a novel finding, the cardiac symptoms in COVID-19 patients⁵² may be related to the PM theory of cardiac involvement during PA. Such issues must be examined in detail to be proven or disproven in future research. Furthermore, the loss of the smell and taste senses in many patients with COVID-19⁵³ may be related to PM physicians' emphasis on the use of fumigation therapy with fragrant plants; this can form the basis of studies on the effects of these substances on stimulating the olfactory system and recovering the senses of patients, which is a promising sign during treatment.

In the current pandemic, due to the ease of person-to-person transmission and the rapid, global spread of COVID-19 in the absence of definitive treatment and vaccination, the World Health Organization's key policies are the observation of personal hygiene and the establishment of social distancing through quarantining cities and limiting crowding or attendance in public places. By comparing the strategies of PM in encountering all kinds of pandemics (especially those of respiratory infections) with the current policies and actions of the health systems in countries affected by the pandemic, no contradictory matters of great significance were seen. Furthermore, PM places distinctive emphasis on the lifestyle of the individual, with various suggestions in the form of the six essential principles as well as the nonessential principles. These recommendations can increase the body's ability to deal with the pathogen by strengthening its temperament through the use of appropriate natural medicines and products, providing complementary and effective solutions to scientists and health policymakers in the fight against the COVID-19 pandemic.

The main limitation of the current study is the difficulty of exploring causality because it is based on beliefs and judgments rather than outcomes. Additionally, the statistical representation of findings is not applicable here, rendering this work difficult to replicate. Some mentioned medicines and practices such as fumigation and embrocation seem safe to be utilized for decreasing the chance of infection in respiratory outbreaks. We also suggest conducting pilot clinical trials assessing the effectiveness of the fruits introduced in the PM literature (apples, quinces, and pomegranates) in treating antibacterial infections given adequate *in vivo* and *in vitro* evidence.

In conclusion, no significant contradictions were found in this study between current guidelines for the control of pandemics and those of traditional Persian physicians. Therefore, it is essential to pay attention to factors that may currently be overlooked (e.g., nutrition, body cleansing, strengthening the temperament) and to assess the multifactorial and cumulative effects of these factors.

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Conceptualization: MI, YK, FM and MP. Methodology: FM, MI and MP. Data Curation: FM, MI and MP. Formal Analysis: MI and YK. Investigation: MP, FM and MI. Software & resources: FM. Writing – Original Draft: MI, YK and MP. Writing – Review & Editing: FM, MI and MP. Supervision: MP and MI.

Conflict of interest

MP is an editorial board member of this journal but editorial board member status had no bearing on editorial consideration. The authors have no other conflict of interest to declare.

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Ethical statement

Not applicable for this manuscript as this work did not involve human subjects or laboratory animals.

Data availability

Data will be made available upon request.

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