



COVID-19: Traditional Persian Medicine opinion for pathophysiology

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Abstract

Introduction: Since December 2019, COVID-19 has caused a pandemic. The use of effective and safe complementary therapies can be helpful in COVID-19 treatment. Traditional Persian medicine (TPM) is a kind of traditional medicine based on more than a thousand years of Persian medical practice. The purpose of this research is to introduce TPM opinion for the study of COVID-19 pathophysiology.

Materials and Methods: TPM literature was searched during centuries 4th to 13th AH, using these keywords: “Havaye vabaii” and “Homayat”; Databases (PubMed, PMC, Google Scholar, and Scopus) were also searched by: “fever”, “cough”, “dyspnea”, etiology, pathophysiology of COVID-19. This research has been done in seven phases.

Results: According to TPM resources, the human body is comprised of four primary elements: earth, water, fire, and air, and their combination makes humors (*Khelt*) and temperaments (qualities). The ingested food undergoes four stages of digestion to produce four humors in body including blood, phlegm, yellow bile, and black bile. The balance of four humors is effective in health maintenance. Persian Medicine physicians believe, that all diseases can be prevented and cured by modification and avoidance of etiologic factors. We tried to explain, that humors change in exposure to Coronavirus due to hepatic dysfunction and based on TPM texts.

Conclusion: According to the results of the present research, some methods for effective prevention and treatment suggestions for COVID-19 can be proposed in the context of Persian medicine and based on the opinion of Persian medical scholars.

Keywords: COVID-19, Traditional Persian Medicine, Model of pathophysiology, Treatment

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Introduction

Coronavirus is an enveloped RNA virus of the Coronaviridae family, that can infect humans and other mammals (1). Coronaviridae includes variants of viruses, four subtypes of which lead to 10 -30% of upper respiratory infections. However, since the 21st century, two other types of the virus appeared, which have emerged with acute respiratory syndromes (2), including severe acute respiratory syndrome coronavirus (SARS-CoV) (3, 4) and the Middle East respiratory syndrome coronavirus (MERS-CoV) (5, 6); these two respiratory syndromes led to a pandemic outbreak (approximately 10,000 cases) in 2003 and 2013, respectively, with varied mortality (SARS: 10% and MERS: 37%) (7).

Since December 2019, a new pathogen has led to severe pneumonia in Wuhan, China, and has been named 2019 novel coronavirus (2019-nCoV) by the World Health Organization (WHO). This pathogen has high transmission power and causes severe pneumonia, which has been associated with different mortality rates in different countries (8-10). In the early stages of pneumonia, symptoms of severe acute respiratory distress develop, and some patients develop acute respiratory distress syndrome (ARDS), acute respiratory failure, multi-organ failure, and finally death happens (11).

Today, non-pharmacological interventions (NPIs) are the basis for COVID-19 control. Although NPIs are effective in disease prevention, they have long-term unpleasant economic consequences, and most countries limit or eliminate these types of interventions. It leads to disease recurrence (12).

Due to the extraordinary importance of this new disease and its effects on health, quality of life, economic burden and inadequacy of existing interventions, use of effective and safe complementary therapies can provide a new opportunity for the health system. Nowadays, using traditional and complementary medicine in different communities around the world has increased significantly. Also, WHO in its approach of the last 3 decades has emphasized the revival of traditional medicine in different parts of the world (13).

TPM (Traditional Persian Medicine) with more than one thousand years of written history is one of the

medical treasures, that can be used for clinical research (14-18). We tried to explain the changes of the body substances in exposure to COVID-19, based on TPM texts. According to this explanation, effective ways for COVID-19 prevention and treatment can be proposed (19).

Materials and Methods

This research is a qualitative content analysis based on authentic Persian Medicine books in the library environment and electronic resources. This article is summative qualitative content analysis, that is processed in seven classic steps (20-22):

1) The research questions to be answered: “What is COVID-19 disease in the Persian medicine texts, we do not find any diseases, called as “COVID-19”. To find the name of “COVID-19” in the context of Persian medicine, we tried to collect all data about it in the context of up-to-date modern texts. This information includes etiology, symptoms, signs, risk factors and treatment of COVID-19. In the next step, we tried to find one disease, which has the most overlap with COVID-19 symptoms. As a result, COVID-19 in Persian Medicine texts is known as “Hommayat and havaye vabaii”. There is a type of fever called infectious fever, and it is mostly due to the infection of thick and slimy mucus (23).

2) Selecting the sample to be analyzed: In this study, all of the available medical texts of Persian medicine texts in this field were selected. These texts included manuscripts (the book itself or its electronic file) in different centuries from 11 to 20 A.D. We studied and searched historical books, such as Canon of medicine (*Al-Qanun fi al-Tebb*) (24), Liber Regius (*Kamel al-Sana al Tebbia*) (25), Akbari's Medicine (*Tebb-E Akbari*) (26), The Treasure of Kharazmshah (*Zakhire-ye Kharazmshahi*) (27), *Kholasat-o-Tajareb*(28) and *Sharh-ol-Asbab va Alamat* (29).

In the second step, the databases were searched using the keywords of “COVID-19, etiology, pathophysiology and prevention” in PubMed, PMC, Google Scholar, and Scopus.

3) Coding process – All Persian Medicine physicians (ḥukamā), when writing about special diseases recorded their knowledge and experience under three

titles: definition and name (Name Bimari), etiology (Asbab va Elal), and treatment (Darman). According to knowing the predominant pattern in TPM context, we coded and categorized all data under these titles. We tried to translate these findings from Arabic and Ancient Persian to modern medicine language.

4) Defining the categories– All data were classified into two categories: medical findings (Symptoms and signs) and etiology”. This article is focused on the pathophysiology of more common symptoms of COVID-19 in the TPM context.

5) Trustworthiness – Credibility, conformability, and dependability: Given the explanation of different stages of methods, such as keywords and coding process, anyone who has the ability to read and understand Arabic and Ancient Persian language and texts, can derive similar results.

6) Transferability – According to the goals and results of this study, this issue is not considered.

7) Analyzing the results – According to summative qualitative content analysis and given the skill of the authors of this article, we tried to collect all data about the pathophysiology of COVID-19, and categorized these findings into modern style, to achieve this goal: “These findings can be made available for new research”.

Results

According to TPM, epidemics are caused by insalubrious weather, which leads to infectious fever in weak, disabled, and susceptible individuals. The accumulation of concentrated and slimy wastes in the body predisposes to phlegmatic infectious fever in epidemics (30-32).

According to the clinical manifestations of COVID-19, and based on Persian medicine texts, the etiology and mechanism of its pathogenesis can be suggested; the main purpose is to recommend effective treatment and prevention strategies.

Any kind of particle (including COVID-19), which enters the body through the mouth, nose and even the eyes, must enter through the digestive system explained by the Persian medicine sages (33) (Table 1).The various outcomes (mild to severe to life-threatening) in

each digestive phase depends on: 1) strength or weakness of the organ (stomach, liver, all vessels and end organs); 2) the degree of pathogenicity and dominance of the foreign particle.

It is quite predictable, that in people who have poor digestion at each phase, the symptoms related to the same phase will be more dominant. For example, people with bad accumulation or “*emtela*”(34) (I.e., diseases such as obesity or hypertension), quality defects in third or fourth phase of digestion (such as diabetes), poor organ digestion (any chronic organ dysfunctions) are more likely to lose this battle and develop more crucial symptoms. (Table 1)

In the stomach, depending on the number of particles and their pathogenicity, the body (*nature*) intervenes to eliminate and excrete them. These reactions depend on the general strength of the body and digestive organs (especially the stomach and intestines in the first digestion phase), and the following clinical symptoms can be anticipated:

- A. In the best conditions, and if the forces of the first digestion phase (gastric) are powerful, all the particles are expelled through the digestive tract (through feces, vomitus, and gastrointestinal gases and etc.) and the person may not present even the slightest symptom. This is important, because personal health issues are necessary to prevent the transmission of the disease by fecal–oral route.
- B. Occurrence of some gastrointestinal symptoms: If the body is not able to completely excrete pathogenic particles, or their number or pathogenicity is so much that a healthy body cannot cope, increasing the number of bowel movements, nausea, and vomiting is possible, which may be mild to severe, leading to hospitalization for medical interventions and treatments and even death (35).

Gastrointestinal symptoms have been reported in the majority of patients with the infection; at least one digestive symptom have been reported in 50.5% of patients, anorexia in 78.6%, diarrhea in 34%, vomiting in 3.9%, and abdominal pain in 1.9% of patients. In

more severe cases of COVID-19, gastrointestinal symptoms were more intense. Patients with gastrointestinal symptoms had also higher levels of liver enzyme, lower monocyte counts, longer PT, and received more antibiotic therapies rather than those without gastrointestinal symptoms. Physicians should consider COVID-19 in the differential diagnosis of gastrointestinal complaints such as diarrhea, vomiting, and abdominal pain (36, 37).

Note: According to the TPM, scholars, gastric digestion is weaker in heat weather and hot seasons, so it is anticipated that gastrointestinal symptoms will be more pronounced in hot seasons and hot climates (38).

In the second phase of digestion, pathogenic particles may reach the liver and affect the second (hepatic) digestion and disrupt the natural process of blood production (the total of the four humors: Yellow Bile (*Safra*), Sanguine humor (*Dam*), Phlegm (*Balgham*) and Black Bile (*Sauda*). The most important effect of COVID-19 is in this phase; it causes imbalance and disproportion in humor production and increases the number of abnormal humors (*Khelt*), and significantly abnormal Black Bile (ABB) as one hypothesis for some symptoms of COVID-19.

Here it is necessary to review some functions of normal Black Bile, because to be aware about the functions and the manifestations of low normal Black Bile and high ABB (which is heavier and tends to precipitate) can be easily predicted in the organs. These functions include slowing blood flow near the organs, which increases the time of blood stasis near the organs (cells) and results in better and further exchange of nutrients and excrements, stabilizing cell walls and tissues, stimulating appetite, and as a basis, framework and centering centrality for some internal actions of the organs and tissues.

Decrement in the normal Black Bile production and increase in ABB leads to some types of functional anemia, which result in reduced oxygen supply, cell wall instability, especially vascular wall, which increases the risk of instability and vessel rupture and bleeding. Hyper coagulated state is another result of ABB (39, 40). With this hypothesis, we explain two different types of blood disorders in COVID-19,

bleeding disorders and increased tendency to coagulation (41).

The deceleration in slowing blood flow near the organs reduces nutrient accessibility and gas exchange (O₂ and CO₂) of cells, which leads to general weakness symptoms. Also, cell excreta are not completely removed from the site, which also causes some symptoms and diseases.

ABB is much heavier than normal black bile, with more tendencies to deposit and precipitate; after the hematopoietic process, it leaves the liver and through the inferior vena cava goes to the heart. In the heart, it does not have the opportunity to sediment, because of high-speed circulation and hot temperament (*Mezaj*). Therefore, by pulmonary artery, it would be carried to the lung tissue, where due to slower blood flow especially in its periphery, the probability of deposition will be higher. This sediment acts as a barrier and prevents gas exchange in the pulmonary parenchyma, which causes radiographic signs on lung CT scan (35, 42, 43).

In the lung, depending on the strength of this organ and the history of underlying diseases, the impact of these changes caused by COVID-19 can show different manifestations from mild symptoms to death. So, at this stage of pulmonary manifestations, therapeutic interventions that reduce and eliminate this substance will prevent the progression of symptoms. Local treatments include massaging with oils with hot temperament (*Mizaj*)(44), that have solvent properties (*Mohallele garm*), increasing vascular perfusion, and dissolving the dense humor (*Khelte Ghaliz*), especially at the lung periphery, i.e. warm cupping along with massaging with oil, and finally taking tonic drugs and dissolvent of lung harmful substance and coactive agents for ABB of the lungs (43, 45).

After leaving the lungs and returning to the heart (while the existing blood still has abnormal quality), if the heart is weak and its temperament is relatively cold, ABB may deposit in the coronary arteries, causing ischemia and even infarction (46). After exiting the heart and in the arterial blood flow, the ABB would be transmitted to the upper half of the body and brain, and in case of weakness in any organs, symptoms such as vertigo, chest pain (involvement of intercostal arteries),

olfactory or taste disorders, behavioral, psychological and even infarction or hemorrhagic cerebral disorders may develop (47-50).

The transmission of ABB to the lower half of the body may also cause some complications. In this regard, the kidney is a sensitive organ. According to TPM books, immediately after the inferior vena cava exits the liver, two veins separate from it and go to the kidneys (*Talein veins*), so the kidneys are likely to be involved much sooner than harmful blood reaches the renal arteries (51).

Skin manifestations due to ABB deposition such as erythematous rash and urticaria are also possible (52, 53). TPM physicians believe that joints are usually the other part of the body for which there is a possibility of involvement like joint pain (54).

Implications for Practice

According to this etiology, in addition to proposing effective treatments at every stage of the disease and according to the predominant manifestations of the involved organs, treatments based on TPM texts can be suggested.

Furthermore, it can be anticipated, that in warm seasons and warm climates, gastrointestinal symptoms of the disease are dominant. In autumn and dry seasons and dry climates, we should expect more cases that respond to remedy later and harder, especially in people with dry temperament (*Mezaj*). There is also a possibility, that in autumn and dry season, the skin symptoms of the disease would be more common, and people with a history of allergies and asthma are more at risk than ever before.

Discussion and Conclusions

TPM has a holistic view to human health, and its terminology and basis are different from modern medicine and is mostly based on the symptoms and signs. It is difficult to explain this opinion in terms of modern medicine. In TPM, the principle of effective treatment is to consider the symptoms and their causes based on the doctrine of TPM. So, its translation into modern medicine is difficult.

On the other hand, the words “Corona” and “Virus” are not mentioned in TPM, but the patients are treated

based on their symptoms according to TPM doctrine and texts. Because the treatment is mostly in the form of a package, it is suggested to design studies to evaluate the effect of these interventions according to the phases and symptoms of COVID-19 (15, 16).

The limitations of the present study were the difference in the language and perspective of the two schools of conventional medicine and TPM, in which some restrictions were removed by matching the symptoms of COVID-19 in the TPM books.

Author contribution

Study concept and design: **AJ**. Acquisition of data, drafting of the manuscript and major contributors in writing the manuscript: **SJ** and **FGS**. Analysis and interpretation of data: **AJ** and **MQ**. Critical revision of the manuscript for important intellectual content and read and approved the final manuscript: **AJ, SJ, FGH** and **MQ**. Study supervision: **MQ**.

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Conflict of interest

None declared.

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