



Lifestyle and Irritable Bowel Syndrome, the Viewpoints of Persian and Conventional Medicine: A Review Article

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Abstract

Background: Irritable bowel syndrome (IBS) is one of the most common functional disorders of the gastrointestinal (GI) tract. Several pathophysiological mechanisms have been proposed for this disorder, but no effective treatment exists for all patients, making it a problematic chronic disease. The present article aims to review the perspective of Persian medicine (PM) scholars, including opinions on patients' predisposing factors and lifestyle, on this disorder and compare it with recent findings.

Methods: In this review, we searched the leading Persian medical books from the 10th to the 18th century AD regarding the pathophysiology and predisposing factors and the six essential health principles of the diseases with the most congruity with IBS. Moreover, we searched the Google Scholar, Science Direct, and PubMed databases for recent evidence on each item.

Results: According to PM, this syndrome is a heterogeneous disorder resulting from various dystemperaments of the GI tract. Dystemperaments are due to accumulated waste material or excess humors in body organs or exposure to unsuitable weather or diet. Diet, mental status, exercise, body excretions, sleep, and weather are the six essential principles for maintaining health, and imbalance in any of them can cause many diseases, including IBS. Several of these lifestyle recommendations regarding the six essential principles of health are supported by recent research.

Conclusion: PM strategies for preserving and restoring health through lifestyle modification in IBS patients may provide researchers with new viewpoints for exploration.

Keywords: Irritable bowel syndrome, Persian medicine, Diet, Lifestyle, Six essential principles

Citation: Mohebbi M, Hasheminasab FS, Setayesh M, Hatami K, Naghizadeh A, Khadem E. Lifestyle and irritable bowel syndrome, the viewpoints of persian and conventional medicine: a review article. *Journal of Kerman University of Medical Sciences*. 2024;31(5):278-285. doi: 10.34172/jkmu.2024.43

Received: October 9, 2022, **Accepted:** August 20, 2023, **ePublished:** October 30, 2024

Introduction

Irritable bowel syndrome (IBS) is a common functional disorder of the gastrointestinal (GI) system characterized by chronic abdominal discomfort or pain in association with altered bowel habits in the absence of detectable morphological, histological, and biochemical abnormalities (1). The prevalence of IBS in the general population is approximately 11%, with female predominance, and the incidence rate is 67 per 1000 person-years (2,3). This disorder has a considerable effect on quality of life and can induce severe disability (4).

Until recently, IBS was considered to be due to alterations in GI motility or visceral hypersensitivity, but lately, other mechanisms have been proposed, including disorders of the gut-brain axis, genetic factors, infections, disturbances in the intestinal microbiota, low-grade

mucosal inflammation, altered intestinal permeability, diet, disordered bile salt metabolism, and abnormalities in serotonin metabolism (5).

Despite our developing knowledge, pharmacological treatment merely alleviates symptoms and does not eliminate the pathological basis. Thus, many patients remain undertreated and must tolerate this chronic disease (6,7).

Nowadays, many IBS patients use traditional and complementary medicine for symptom relief (8,9). Persian medicine (PM), one of the oldest traditional medical systems, has a holistic view of the human body in which all the organs work correlatively. Recent research has investigated several therapeutic options proposed by PM, such as various pharmacological formulas, manipulation methods, or even lifestyle modification advice on different disorders. PM can offer some treatment, including



recommendations regarding lifestyle modification for controlling IBS (10-16). IBS has been common in human society since ancient times, prompting our ancestors to attempt to treat it. Using their experience, treatment approaches, and advice about these types of functional disorders seems rational. In this article, we review PM scholars' viewpoints on this disorder, especially their opinions regarding lifestyle modification, and compare them with modern studies and recent conceptions.

Methods

This study identified the most congruous disease names based on IBS signs and symptoms, i.e., "maghs" and "ghoolenj." Then we studied the related predisposing factors and recommendations regarding lifestyle modification in the leading PM textbooks such as *Kholasat-al-Hekmeh* of Mohammad Hossein Aghili Khorasani (18th century AD) (17), *Zakhire-ye Kharazmshahi* by Ismaiel Jorjani (1041–1136 AD) (18), *Teb-e-Akbari* by Akbar Arzani (17–18th century AD) (19), *Qanoon fi-al-Teb* (Canon of Medicine) by Avicenna (980–1037 AD) (20), *Exir-e-Azam* by Mohammad Azam Khan Chashti (18th century AD) (21), and *Al-Havi* by Abubakr Muhammad ibn Zakariyya al-Razi (854–925 AD) (22). Then, we assessed the proposed topics by searching papers in the past two decades in the Web of Science, Google Scholar, Science Direct, and PubMed databases to compare the PM recommendations with recent findings in the field of IBS. In this regard, IBS was searched along with keywords including "diet," "sleep," "exercise," "mental status," "weather," and "excretion." The reference section of the identified papers was also checked to find any relevant articles.

Results

Definition of IBS according to PM

Modern medicine and PM have different terminologies regarding diseases. Therefore, we should find the most compatible disease according to definitions, signs, and symptoms. Symptoms are sometimes referred to as diseases in PM literature, along with discussions of their etiology and differential diagnoses. Two terms are most congruous with IBS in terms of definition. "Maghs" is an abdominal pain originating in the small and large intestines with or without diarrhea. It has several pathophysiological mechanisms that will be discussed below. "ghoolenj" is severe abdominal pain of the large intestine source accompanied by difficulty in defecation (from constipation up to obstipation) due to different etiologies (13,20,21).

Pathophysiology of IBS according to PM

Below, we have outlined the pathophysiology of "maghs" and "ghoolenj," which are more congruous with IBS (13,17-23).

1- Simple cold bowel dystemperament: It should be

noted that the normal temperament of the bowels is cold and dry. Motility and digestive function will decrease when excess coldness is imposed (through cold weather or diet). Spasms of abdominal muscles and the anal sphincter, gas production (due to maldigestion), and constipation (due to the hardness of stools within the bowel) induce pain.

- 2- Simple warm bowel dystemperament: Excess and prolonged exposure to hot foods or the weather is contrary to the natural temperament of the bowels and leads to dysfunction and pain in patients with the imposed hot temperament of the stomach and bowels.
- 3- Choleric dystemperament of bowels (meaning excess bile acid within bowels): Increased production of bile acid due to genetic predisposition or consumption of spicy, fatty, or sweet foods induces pain and diarrhea by irritating the bowels and sometimes by disconnection and inflammation.
- 4- Excess black bile or melancholic dystemperament of the bowels could result in pain by producing flatulence. Occasionally, these substances result in disconnection and inflammation by irritating and burning the bowel wall.
- 5- Phlegmatic dystemperament of bowels: Consuming excessive cold and wet food and immobility in patients with a cold stomach could produce excess phlegm (humor with cold and wet temper), changing the body temperament and resulting in different diseases. Phlegm accumulates in the stomach from food sources, head and pharynx secretions, or other body organs. There are various abnormal phlegm types, which are classified according to their consistency or taste. Accumulation of phlegm will change the temperament and motility of the bowels. Excess phlegm accumulation can induce diarrhea by two mechanisms: 1- accumulation of raw phlegm in the bowel wall carries the bowel contents down; 2- salty (warm) phlegm (bile acid mixed with phlegm) irritates the bowel mucosa, leading to diarrhea.

Phlegmatic dystemperament of the bowels can result in non-obstructive (functional) constipation by various mechanisms: 1- cold and wet dystemperament of the GI will usually disturb the function and temperament of the liver and subsequently decrease production of yellow bile; 2- thick adherent phlegm (cold phlegm) with adherence to the bowel wall or stool leads to bowel dysfunction or constipation and induces spasms to eliminate the stools; 3- coldness of the bowels due to cold humors will decrease bowel energy and motility.

The pathologies mentioned above can lead to bowel dysfunction, maldigestion, flatulence, diarrhea, constipation, and pain.

Predisposing factors for diseases

PM is based on temperament theory. According to PM,

health factors are categorized into six groups, known as six essential principles, which have an important role in health. Correct adherence to these six essential principles would maintain body health and prevent diseases. PM believes the first and most crucial step for managing every disease is advising non-pharmacological treatment introduced as lifestyle modification based on the six essential principles (17,23,24). In this regard, we will discuss the role of these factors in IBS.

Diet and IBS

According to PM, appropriate foods and drinks for each person depend on the body's temperament, living environment, occupation, and seasonal conditions (17). This is the subject of sciences such as nutrigenetics and nutrigenomics, which study the influence of genetic variation on dietary requirements (25). Based on PM's viewpoint, foods have different temperaments. Hot-tempered foods produce heat and energy for movement, while cold-tempered foods consume much energy for digestion in the stomach and the body and cool the body. Wet and dry-tempered foods make the body wet or dry, respectively. We use foods of the opposite temperament to maintain health or treat disease. Some foods are digested quickly and dilute the blood or humors, while some are viscous and compact, demand higher energy consumption for digestion, and produce a lot of thick and viscous humors in the blood. The latter group is not appropriate for patients with dyspepsia (13,20,21).

These classifications help us choose appropriate substances or foods to maintain health or treat diseases. The food-making process and the contents of food are essential in PM. Therefore, they are arranged to reduce the side effects of food components.

IBS has different etiologies, including different predisposing factors and diet. Therefore, diet should be individualized according to disease etiology in IBS patients, and treatment cannot be undertaken using a unique recipe. According to recent studies, certain food items such as wheat products, milk and dairy, caffeine, onion, cabbage, beans, peas, hot spices, and fried and smoked food trigger symptoms in a subgroup of patients with IBS. In addition, coffee is a colonic stimulant, and dietary fats can increase colonic hypersensitivity (26). Insoluble fibers such as fermentable, poorly absorbed oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) are potential culprits in the induction of IBS symptoms in a subgroup of patients due to their fermentation and osmotic effects. They are present in various foods, including wheat, rye, vegetables, fruits, legumes, lactose-containing foods, and artificial sweeteners (27). A low-FODMAP diet induces alterations in the microbiota, reduces fermentation and gas production, and induces favorable changes in the GI and endocrine systems (26). The triggers mentioned above could induce IBS symptoms

via different pathophysiological mechanisms.

Spelt contains significant amounts of FODMAP, which could produce much gas and can trigger IBS symptoms. The breadmaking process affects the carbohydrate profile of bread, which in turn alters the pattern of fermentation in the colon. Only the sourdough fermentation process could produce carbohydrates that could be well-digested and absorbed in the upper part of the GI tract (28). Some studies report that a prebiotic diet can improve IBS symptoms and can be added to the diet as a supplement (29).

A Western dietary pattern (including fat, sugary products, and processed foods) and frequent consumption of fast food is positively associated with dysbiosis, pro-inflammatory T helper type 1 immune response, increased risk for allergic and auto-inflammatory disease, colitis, lipid and lipoprotein disorders, metabolic syndrome, diabetes mellitus, and IBS (30,31). According to PM, these types of food produce phlegm and can result in phlegmatic dystemperament of the bowel in susceptible patients.

Mental status and IBS

Environmental situations affect our spirit and induce anger, happiness, sadness, joy, fear, shame, hopelessness, hopefulness, or thinking (about essential things or goals). Anger in moderation is helpful to the body, but excess levels increase yellow bile and produce excess heat and even fever. Happiness, hopefulness, and joy in moderation increase body power, improve digestion and body intake from food, refresh the body, excrete waste material, and delay aging. Sadness, fear, shame, and hopelessness cool and dry the body's surface, weaken all body powers, make the face pale, and accelerate aging (17,23). Body diseases or dystemperaments can also affect the mind and brain function (thinking, emotions, sleeping, etc).

As mentioned above, a mutual relationship exists between spiritual affections and body dystemperaments. Furthermore, the brain and the body can affect each other, according to PM literature. Swallowed pharyngeal secretions can affect the stomach, spoil food, and induce dyspepsia or diarrhea. On the other hand, stomach and other intraperitoneal organ dysfunctions can induce headaches and other brain disorders (e.g., *meraghi melancholia*) (18-21,23).

Epidemiological studies show that psychiatric disorders, most notably anxiety and depression, are prevalent in almost a third of all patients with IBS (32). In about half of the patients, these psychiatric disorders develop after the onset of IBS (33,34). Pre-existing anxiety or depression increases the risk of developing postinfectious IBS symptoms. Conversely, intestinal inflammation and gut dysbiosis could play a role in brain alterations in IBS (35). Chronic stress has been implicated in the pathophysiology of IBS by modulating sensory and motor function via corticotropin-releasing hormone and catecholaminergic

signaling (5). In animal models, psychological stress increases visceral hypersensitivity (35,36).

Recently, the gut microbiota and their metabolic products have been proposed as a plausible mechanism in bidirectional brain-gut interactions because they influence gut permeability, the mucosal immune function, pain modulation systems, the enteric nervous system, and the brain (37,38).

Sleep and IBS

According to PM, sleep is needed to digest and metabolize food, remove accumulated substances in the body after hard work, restore brain and body power and function, improve consciousness and mental function, prevent body wasting, and increase body wetness. Short sleep is due to a hot and dry temper of the brain, while prolonged, deep sleep is due to a cold and wet temper. Even dreams are affected by body or brain dystemperament.

The best time for sleep is at night and after complete gastric digestion; otherwise, food will spoil in the stomach. On the other hand, prolonged sleeping in a hungry state harms the body. Prolonged sleep results in sluggishness, decreased wasting of accumulated substances, accumulation of the phlegm humor in the body, and even inflammation and fever (due to accumulated substances). Prolonged insomnia stops digestion and metabolism of foods, increases body wasting, increases black bile and subsequently leads to skin discoloration, induces mental disorders and weakens the memory, increases appetite, weakens digestion (due to wasting of digestive power), and induces inflammation and fever (39).

Hence, the relationship between sleep and IBS is bidirectional. Different sleep disturbances could be seen in IBS patients due to different body and brain dystemperaments. Conversely, we could predict that different kinds of sleep disturbances could lead to different kinds of body and GI dystemperaments and, subsequently, IBS symptoms.

Studies have shown that the incidence of IBS is significantly higher in rotating night shift workers compared to daytime workers (40-42), and treatment with melatonin significantly reduces symptoms and improves the quality of life and constipation in 50% of IBS-C patients (43,44).

Chronic sleep deprivation increases the risk of hypertension, diabetes, obesity, stroke, heart attack, and overall morbidity and mortality. Altering the circadian rhythm and chronic sleep deprivation activate interleukin (IL)-1 and tumor necrosis factor (TNF) and, in animal models, change gut microbiota, increase food intake and insulin resistance, and lead to systemic and visceral white adipose tissue inflammation without body weight changes (45-47).

Functional gastrointestinal disorders (FGIDs), such as gastroesophageal reflux disease, ulcer-like dyspepsia,

functional constipation, alternating IBS, and diarrhea-predominant IBS are associated with excessive daytime sleepiness (EDS). EDS is more prevalent in patients who suffer from most kinds of FGID (48-50).

Longer sleep duration (more than 6-7 hours per night) increases pro-inflammatory cytokine release, specifically CRP and IL-6, and increases cortisol secretion and insulin resistance, resulting in obesity. Obesity is a major risk factor for sleep apnea, resulting in poor sleep, which could lead to GI disease (51-53).

Exercise and IBS

Avicenna believed that exercise is the most critical factor of the six essential principles of health (20). Exercise will prepare remaining substances (e.g., excess humors and noxious accumulated substance) for excretion from various appropriate routes, such as the skin or GI tract. Eliminating them will strengthen all body organs and the GI system, improving their function. Massage, cupping, and different manipulations (such as visceral manipulation) are different forms of exercise that can be used in different conditions. "Maghs" and "ghoolenj" or IBS are due to the accumulation of different types of humor – most frequently phlegmatic humor – in the GI tract with or without other organs' involvement. Thus, in IBS patients, exercise should be considered an important treatment method (17,54).

Recent studies indicate that chronic subclinical inflammation associated with the metabolic syndrome results in fatigue, reduced movement, and depressive symptoms. This physical inactivity could induce a vicious cycle (55). Exercise can boost antioxidant capacity, induce anti-inflammatory effects, and improve exercise ability. It regulates fat and glucose metabolism, decreases insulin resistance, and lowers blood pressure in overweight adult patients (55). Recent findings indicate that exercise improves the abdominal symptoms of patients with IBS and their quality of life. Exercise increases gut motility and significantly improves constipation (56-58). Moreover, a systematic review has reported osteopathic manipulation to be beneficial in the treatment of patients with IBS (59).

The Centers for Disease Control and Prevention and the American College of Sports Medicine recommend at least 30 minutes of moderate-intensity physical activity (equivalent to brisk walking at 3-4 mph) daily for the general population (60,61).

Body excretions and IBS

Our body excretes the waste material of foods via defecation, urine, perspiration, and other body discharges. Defecation is an essential way to remove the waste material of food and metabolites of nutrients that enter the bowels. Constipated patients are susceptible to the accumulation of harmful substances and humors in the GI and body organs that result in dysfunction. On the other hand,

excess diarrhea or vomiting will result in body weakness and many diseases (17).

Constipation can result in abdominal pain, abdominal distension, headache, dizziness, and poor appetite (62). Recent studies show that neurological diseases, including multiple sclerosis and Parkinson's disease, are strongly linked to constipation. Even cardiovascular disease, depression, and anxiety are more prevalent in patients with constipation (63,64). The prevalence of metabolic syndrome is significantly higher in female patients with chronic constipation (65).

Growing evidence incriminates altered intestinal microbiota in developing constipation and constipation-related symptoms. This could be due to changes in their metabolic products, which influence colonic motility and visceral sensitivity and generate IBS symptoms by different mechanisms (66-70).

Weather and IBS

According to PM, cold and hot weather can affect our bodies in ways similar to foods and drinks. Hot or cold weather induces simple hot or cold dyspepsia of the body and the GI tract and could result in diarrhea, constipation, and abdominal pain.

Recently, moderate or greater seasonal changes in bowel symptoms have been reported by 23% of IBS patients, although this has been attributed to somatization (71,72). Air pollutants significantly contaminate both food and water supplies. In addition, mucociliary clearance quickly clears larger particles from the lungs and directs them to the intestines (73). Epidemiological data suggest that short-term exposure to air pollution increases emergency department visits for non-specific abdominal pain and appendicitis in young individuals (74,75). A similar finding was reported on the effects of air pollution on the development and flare-up of inflammatory bowel diseases (76,77). A longitudinal cohort study indicated that long-term exposure to air pollution is a risk factor for childhood IBS (78). Air pollutants are directly cytotoxic to intestinal epithelial cells and reduce colonic contractility due to neuronal impairment (79). They increase epithelial layer permeability and induce a pro-inflammatory response, which can drive systemic inflammation and change the gut environment and microbiota (79,80). Particulate matter can increase the risk of chronic metabolic and autoimmune diseases such as obesity, diabetes mellitus, atherosclerosis, and neuro-inflammation by increasing levels of systemic inflammation (81,82).

Discussion

Medicine is as old as history. The common goals of various medical schools throughout history have been maintaining health, reducing human suffering, and increasing the quality and length of life. In examining scientific history, we come across great medical schools

such as traditional Indian medicine, traditional Chinese medicine, and PM. PM, with several thousand years of history, is a traditional school of medicine that has made a notable contribution to human civilization and culture (83). Moreover, by embracing a scientific approach and relying on the previous findings, renowned PM scholars, such as Avicenna, Ismael Jorjani, Razi, Haly Abbas, etc, established a branch of medical science in Iran based on wisdom, knowledge, and experience. Unlike conventional medicine, this medical school has a holistic view (84,85). In contrast to the positivist view in medicine that relies solely on sensory experiences for all data, the enormous complexity of the human body and its organs, mental and spiritual dimensions of individuals, and also a detailed analysis of different physical pathways at a larger scale have been considered in PM (85, 86). Recent research in alternative and complementary medicine that compares the holistic view with the positivist view supports the relative success of the holistic view (85).

Due to differences in terminology and classification of diseases in PM with conventional medicine, finding similar conditions and disorders to extract data from PM manuscripts is very important. The perception of IBS from the perspective of PM has been comprehensively discussed in a previous study. In summary, considering abdominal pain as the most crucial diagnostic factor and also defecation discharges as the other vital signs of IBS, "ghoolenj" and "maghs" have the highest congruity with this disease (13). The pathophysiology of IBS based on temperament theory has been explained in PM. According to PM literature, every substance, including every humor and body organ, has a temper that has two characteristics: it is either warm or cold and either wet or dry. An imbalance or excess in these pairs of natures (one or both) will result in organ dysfunction and disease. Humors are produced from the digestion of consumed foods and drinks. Changes in the quantity and quality of the four humors (blood, phlegm, black bile, and yellow bile) alter the organs' temperament and functions, sometimes leading to disconnections and changes in the organ's shape. Substances (humors and gas) can accumulate adjacent to organs or within their lumen and can even penetrate the tissues and cause disconnection, disfigurement, inflammation, and pain. Hence, abnormal accumulation of humors in organs could result in a spectrum of dyspepsias and dysfunctions, including inflammation. Penetrating humors have an irritant, acute, burning, or corrosive property. The source of the causal substance is either the bowels (from food) or other organs. It can accumulate in the bowels or all body organs. Sometimes, exposure of body organs to a condition such as cold or warm weather could result in simple organ dyspepsia without humor excess (17,23).

According to PM's advice, the role of lifestyle modification is based on six essential principles in

preventing and managing every disorder, such as IBS and temperament imbalance (13,83). Recently, several studies have provided evidence of the importance of diet, weather, and other essential principles in better control of this disease. Therefore, considering the importance of lifestyle modification in conventional medicine and the six essential principles in PM on managing IBS, evidence-based lifestyle recommendation is well advised.

Conclusion

According to PM, *maghs* (IBS) is due to different pathologic agents (outlined above), but bowel motility disturbance, flatulence (a marker for maldigestion and malabsorption), and pain are shared between them. Using this concept, we should assess the etiology of disease in each patient and use the proper treatment strategy. In addition, the predisposing factors should be obviated for effective treatment and prevention of relapse. PM has proposed measures to prevent and alleviate IBS symptoms based on this review. Although the mentioned advice and recommendations are recorded in ancient times, recent research has supported many scientifically. However, further clinical trials are needed to investigate their efficacy further.

Authors' Contribution

Conceptualization: Khadijeh Hatami.

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Competing Interests

The authors declare that they have no competing interests.

Ethical Approval

Not applicable.

Funding

None.

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