Irritable Bowel Syndrome: A Review Article

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ABSTRACT

Irritable bowel syndrome (IBS) is the most prevalent functional gastrointestinal disorder noted in the general population worldwide. Its chronic nature, signs and symptoms which vary periodically from mild to severe have many negative effects on the quality of life for the sufferer; therefore the appropriate treatment of these patients is highly important. Patients should be informed by their doctors that the nature of the disease is benign, and educated on how to deal with and control symptoms of the disease. This article sets out a review of recent studies on the prevalence of IBS in Iran and appropriate methods for management of patients affected by IBS.

KEYWORDS
IBS; Iran; Anti-depressant; Genetic Factors; Immunological Mediators; Probiotics

INTRODUCTION

Irritable bowel syndrome (IBS) is the most common reason for referral to gastroenterology clinics.[1] The disease is characterized by abdominal pain, diarrhea, constipation or a combination of both diarrhea and constipation, mucus discharge along with stools and changes in the form (appearance) of stools. The main cause of disease is not entirely apparent as various factors play key roles in its etiology. IBS is a disorder that is not confirmed by a specific test Instead, diagnosis is based on specific symptoms termed the Rome criteria. Ruling out other conditions that cause similar signs and symptoms is essential for an accurate diagnosis.[2,3] IBS is the most common disorder witnessed by gastroenterologists in the USA[1] and roughly 15% of Americans suffer from symptoms relating to IBS;[4] yet only a small percentage of sufferers choose to visit their local general practitioner (GP). Annually between 2.4 and 3.5 million people suffering from IBS consult a doctor in the USA. The total annual cost of IBS in the USA has been estimated at $1.7-$10 billion in direct medical costs, with an additional $19.2 billion in indirect costs.[5-9] In Iran, the only annual cost evaluation of IBS has been done by Roshande et al.[1] who have reported a total yearly cost of IBS to be 2.8 million dollars for the

urban adult population, which puts a heavy burden on the economy of Iran as a developing country.[9]

Several studies have reported the prevalence of IBS in Asia to vary between 3.5 and 25% with the lowest prevalence being reported by Massarrat et al.[10] from Iran and the highest in Japan by Schlemper et al.[11] In developing countries neighboring Iran, such as Pakistan and Turkey, prevalence rates were 14% and 10%, respectively.[12,13]

Limited epidemiological studies based on some defined social groups present in different regions with regards to IBS have been performed in Iran, but a classical survey based on the normal population is still to be conducted. A study done by Mahmudi et al. has shown the prevalence of IBS in medical students at Tehran Medical University to be 4.2% with more prevalence among females (4.9%) with a mean age of 20 years.[14] Hatami et al. have evaluated the prevalence of IBS in blood donors and noted 4% prevalence in males and 11% in their female counterparts.[15] A study conducted by Ghanaei et al. among medical students at Guilan University noted an overall prevalence of IBS of 12.6% and it was shown to be more prevalent in females than males (15% vs. 8.1%).[16] The prevalence of IBS recorded by medical students in the Golestan University of Medical Sciences as reported by Semnani et al. was 10.6%. IBS was shown to be more prevalent in females rather than males patients.[17] In a study of 5492 randomly selected subjects in Shahrekord by Hoseini et al., the prevalence of IBS was recorded as 5.8% and the female-to-male ratio among subjects with the disorder was noted to be 1.17 to 1.[18] Since IBS patients had the highest treatment costs among patients with functional GI disorders,[9] several studies have been conducted to evaluate its etiology.

Patho-physiology of IBS:

Since 1950, several theories have been proposed regarding the etiology of IBS of which the most important are as follows:

Altered responses of general stress circuits:

The amygdala located in the CNS is known as an important structure active in the response to anxiety. This center activates the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic system when patients find themselves in anxious situations. Chronic anxiety increases the activity of the amygladala leading to the formation of an HPA axis which will ultimately cause induced visceral hyperalgesia.[19,20] Visceral hypersensitivity is considered to be one of the main factors that cause symptoms in IBS suffers and has been shown to play a key role in the pathophysiology of IBS.[21]

The alternation of autonomic and neuro-endocrine systems in response to visceral stimulation:

In IBS sufferers an enhancement of their colonic sensitivity to factors such as infection, chronic inflammation, gastrointestinal (GI) micro-flora and impaired down regulation appears to be of importance in the pathogenesis of IBS.

The enhancement of colonic sensitivity in response to stress, food, physical stimulation, CCK and corticotropin releasing factor (CRF) has been shown to be evident in individuals complaining of IBS.[21] Changes have also been shown in intestinal motility, in the form of an increase in MMC, and retrograde duodenal and jejunal contractions.[22-24] Numerous high amplitude contractions (HAPCS) seem to suggest an increase in IBS-D and reduction in IBS-C.[25]

Serotonin:

Serotonin is synthesized and released by enterochromaffin cells in the GI and plays an important role in regulation of GI motility, sensation and secretion. Excess released serotonin is mopped up by the serotonin reuptake transporter (SERT).[26,27] Its physiological effects on IBS patients form the basis of two subtypes, namely 5HT3 and 5HT4,[28] causing improvement in IBS-C patients[29] while 5HT3 has an invert effect as an anti-diarrhea in IBS-D.[30]

Serotonin promotes its effects on the GI system through motility, secretion and visceral sensation; various studies have indicated the role of intolerance in the functioning of 5HT in the non-organic GI system, particularly in IBS following disturbances in the secretion and its reuptake. Several studies have indicated a noted imbalance in the functioning of 5HT due to an impairment in its release and reuptake mechanisms by SERT in functional GI disorders which has in particular been shown to be true of IBS.[27,31]

Low grade inflammation:

One of the factors that have an important role in IBS is regulation of the immune system. This can be further alluded to by describing and analyzing its effects on GI infections, IBD and microbial flora.

Post-infectious IBS:

Between 3 and 35% of patients assessed progress on to develop IBS symptoms three to twelve months after suffering from GI infections.[32,33] In particular, a rise in mucosal inflammatory cells, especially mast cells, in various parts of the small intestine and colon has been shown. An increase in the release of certain mediators such as nitric oxide, interleukin, histamine and protease leads to the stimulation of the enteric nervous system; such mediators eventually cause impairments in motility, secretion and hyperalgesia of the GI tract.[34]

IBS–IBD:

Disorders in the down regulation of the immune system in patients suffering with IBD during the remission phase can increase the prevalence of IBS in such patients. Several studies have demonstrated a higher prevalence of IBS among patients affected by IBD.[35]

The role of bacterial flora in IBS:

There are a limited number of bacteria such *as Lactobacillus* and *Enterococci* in the stomach and upper parts of the large intestine. However, the number of microorganisms shows a vast increase in the distal parts of GI system and can reach as high as 10^{12} per ml. Some studies claim that a relationship between the microbial flora of the gastro-intestinal tract and IBS may exist. Changes in the quantity and quality of bacteria present can convey selective effects on sensory-motor dysfunctions which can be influenced through bile acid malabsorption, mucosal irritation and inflammation, increased food fermentation and gas production.[36,37] Increased fecal numbers of *Lactobacilli*, *coliform* and *Bifidobacteria* have been reported in patients affected by IBS,[38] explaining the suggested use of probiotics in the treatment of IBS.

The role of genetic factors in IBS:

The role of genetic factors influencing the prevalence of IBS has been shown in several studies. Family members of patients suffering with IBS may exhibit similar GI complaints.[39] IBS has been shown to be twice as prevalent among monozygotic twins as compared with dizygotic twins[40,41] A down regulation in the control asserted by genetic polymorphisms and SERT in various studies[42, 43] is consistent with the notion of a significant role played by genetic factors. More recently studies conducted on twins have demonstrated controversial results as to the role of genetic factors in IBS.[44] Some evidence shows that genetic factors can control the production of certain immunological factors such as T-helper 1, 2 ILs-4,6 and IL-10 which can affect individual susceptibility to post-infectious IBS, With the accumulation of more in depth knowledge of the pathophysiology of IBS important breakthroughs can be made in the subsequent treatment process.[45-48]

Clinical manifestations of irritable bowel syndrome:

Symptoms include both GI and extraintestinal complaints with the primary (main) GI syndrome portraying chronic abdominal pain and altered bowel habits.

Chronic abdominal pain:

Abdominal pain is usually described as a sensation of cramps of varying intensity along with periodic exacerbations. The pain is usually located in the lower abdomen, often felt in the lower left quadrant.

Altered bowel habits:

By definition, patients suffering with IBS often complain of altered bowel habits; this can be observed in the volume, frequency and consistency of the patient's stools.

Diarrhea:

Diarrhea is usually characterized as frequent loose stools of small to moderate volume. Stools generally occur during the hours in which patients are awake; frequently in the morning or after mealtimes. Most bowel movements are preceded by lower abdominal cramps (tenesmus), urgency to defecate and often fecal incontinence is perceived which may be followed by a feeling of incomplete defecation. Approximately half of all patients suffering with IBS complain of a mucosal discharge occurring along with their stools. Large volume diarrhea, bloody stools, nocturnal diarrhea and greasy stools are not associated with IBS, but rather suggest an organic disease instead. A subgroup of patients display an acute viral or bacterial gastroenteritis known as post-infectious IBS.

Constipation:

Stools are often hard and may be described as being pellet shaped. Patients may experience a sense of incomplete evacuation occurring even when the rectum is completely empty. This can lead to long periods of time spent in the bathroom.

Other GI symptoms:

Upper GI symptoms include gastro-esophageal reflux, dysphagia, early satiety, intermittent dyspepsia, nausea and non-cardiac chest pain are noted as being common. Patients may also frequently complain of abdominal bloating and an increase in gas production in the form of flatulence or belching.[49]

Extra-intestinal symptoms:

These include impaired sexual function, dysmenorrhea, dyspareunia and an increase in the frequency and urgency to urinate. Patients are more likely to suffer from hypertension, asthma or fibromyalgia.[50,51]

Diagnosis of irritable bowel syndrome:

The definitive diagnosis of IBS has proved extremely difficult. Traditionally, IBS has been diagnosed via a process of exclusion of other clinically defined illnesses. As such, no specific or unique organic pathology has been consistently demonstrated in IBS. There has been an ever increasing desire to create diagnostic protocols due to the large cost burden and numerous patient referrals to GI clinics. The probability of indiscrimination of important and treatable diseases such as Crohn's, colon cancer and the unwillingness of physicians to use paraclinic methods in diagnosis has also added to this desire. Valid criteria that could lead to a positive diagnosis without the need for extensive and expensive testing have been examined. Such criteria included the Manning Criteria that initially introduced a questionnaire which was given to 109 randomly selected patients referred to gastroenterology clinics with complaints of abdominal pain, changes in bowel habits or both in order to identify the presence of symptoms thought to be typical of IBS. A review of the case records established a definite diagnosis of IBS in 32 and of organic disease in 33 of the 109 patients that completed the questionnaire. It was concluded that a thorough case history can increase diagnostic confidence and reduce testing costs in many patients with chronic abdominal pain. Subsequently, the total number of symptoms recorded in the questionnaire were modified and reduced from 15 to 6 criteria (Table 1).[52-55]

Table 1: Diagnostic criteria for irritable bowel syndrome.

Manning criteria for the diagnosis of irritable bowel syndrome

Abdominal pain relived with defecation	Visible abdominal distention
Abdominal pain with more frequent stools at onset of pain	Passage of mucus from rectum
Abdominal pain with looser stools at the onset of pain	Sensation of incomplete evacuation of stool

Rome I criteria

Abdominal pain / discomfort relived with defecation and/or change in stool frequency and/or change in stool consistency greater than 3 months
And two or more of the following symptoms greater than 3 months:
Change in stool frequency at least 25% of the time
Change in stool form at least 25% of the time.
Difficult stool passage at least 25% of the time.
Passage of mucus at least 25% of the time.
Bloating at least 25% of the time.

Rome II criteria

Twelve weeks or more, which need not be consecutive, in the preceding 12 months of abdominal discomfort or pain that has two of the following three features:
Relief of abdominal pain with defecation.
Onset associated with a change in frequency of stool.
Onset associated with a change in form of stool.

The following symptoms are not essential for diagnosis, but their presence increases diagnostic confidence:
Abnormal stool frequency (greater than 3 daily or less than 3 weekly).
Abnormal stool form in greater than 25% of defecations.
Abnormal stool passage in greater than 25% of defecations.
Passage of mucus in greater than 25% of defecations.
Bloating or sensation of abnormal distention in greater than 25% of days.

Rome III criteria

Recurrent abdominal pain or discomfort a minimum of 3 days per month during the past 3 months in association with 2 or more of the following:
Improvement following defecation.
Onset associated with a change in frequency of stool.
Onset associated with a change in form (appearance) of stool.
The outlined criteria should be fulfilled in the last 3 months with symptom onset occurring at least 6 months prior to diagnosis.

In 1980, The Rome I criteria was proposed by a working team as a new diagnostic guideline and upon use was found to be more valuable than previously established criteria.[56]

Utilizing new methodology, the Rome II Criteria which was a modified version of the Rome I Criteria was proposed by the Rome Working Team; in this method specific questions regarding diarrhea and constipation were removed.[57] Later, in 2006, the Rome III Criteria has been further specifically defined by an expanded Rome Working Team to include the following modifications to the Rome II Criteria:[58]

i) The introduction of a frequency threshold relating to symptoms required to meet criteria (recurrent abdominal pain or discomfort for at least three days per month in the previous three months),
ii) The duration of symptoms was reduced from a period of twelve to six months and
iii) The necessity to refine IBS sub-typing regarded as sufficient for diagnostic purposes.

The recommended course of action for patients with intermittent abdominal pain and changes in bowel movements are:

i) Evaluation of the patient to establish whether or not they meet the established Rome criteria,
ii) Paying particular attention to warning signs as an indication for conducting para-clinical testing in order to rule out infectious etiologies,
iii) Serological testing of patients who exhibit apparent symptoms of diarrhea and bloating in the absence of warning signs to rule out celiac disease and
iv) Upon a negative serological test result, patients are ultimately diagnosed and treated for IBS with a recommendation that cases be followed-up after a period of six weeks.

Management of IBS:

IBS is characterized by a variety of chronic symptoms that include abdominal pain, an alteration in bowel habits and flatulence. The disorder has no definitive treatment but could be controlled by eliminating of some exacerbating factors such as certain drugs, stressor conditions and changes in dietary habits. Hidden drug addiction should be considered as well.[59]

Health strategy

Non-pharmacologic management:

Patients should be given sufficient information regarding their disease condition. For instance, patients should be fully informed of the

chronic and benign nature of their condition, that their diagnosis is not likely to be altered, and he or she should have a normal life span. A detailed medical history and physical examination are frequently useful and the examining physician should pay particular attention to their patient's concerns.[59]

The treatment goal in patients suffering with IBS is to reduce their overall symptoms and a subsequent effort should be made to try and eliminate or decrease the patient's primary symptoms which should be addressed on first encounter with the patient. Some recommendations should be put forward to the patients regarding their dietary habits. It should be noted that the intake of foods does not cause IBS; however the contact of food with the GI tissues can convey various effects in individuals suffering from IBS through various immunologic, physiologic and biochemical mechanisms. Therefore recommendations regarding their dietary habits should be based on the following guidelines:

i) A reduction in inflammation is desired in all parts of the GI tract and can be achieved by avoiding the consumption of inflammatory stimulants such as allergens or chemicals, namely benzoates, alcohol, methylxanthines and caffeine consumption that cause the release of inflammatory mediators,

ii) Patients should be educated on how best to consume their three daily meals, by partaking of non-processed and fresh foods that consist of whole grains, fibers and vitamins two or three times a day,[60]

iii) People who have both IBS and lactase deficiency should avoid dairy products. People with bloating and increased gas (flatulence) should try to avoid foods such as beans, onions, celery, carrots, raisins, bananas, apricots and plums. It is recommended that foods containing vinegar, mustard, ketchup and pickled foodstuffs not be consumed either,[60-62] and

iv) In essence, IBS patients should avoid foods that trigger an onset of their symptoms, consume a minimum of high fat foods and take part in regular physical activity.[61]

Psychosocial treatments:

Since anxiety and depression are the most prevalent psychologic conditions among patients affected by IBS, behavioral treatments may be considered in the IBS patients who have associated stress symptoms. Hypnosis, biofeedback and psychotherapy can help to alleviate anxiety levels in these patients.[63-69]

It has been shown in studies that physical treatments such as massage therapy and acupuncture may help to reduce symptoms and emotional signs.[70] Although this is not conclusive, as other studies have shown that the efficacy of acupuncture is the same as placebo.[71]

Pharmacologic management:

Treatment of IBS is based on the main symptoms of the disease such as diarrhea, constipation, abdominal pain or bloating.[72] Determination of disease severity and the patient's major symptoms are deemed as being the main goals of treatment. The characteristics of patients affected by IBS according to disease severity are summarized in Table 2.[58,72]

Table 2: Characteristics of patients affected by IBS according to severity of disease.

	Mild IBS	Moderate IBS	Severe IBS
Prevalence	70%	25%	5%
Practice type	Primary	Specialty	Referred
Symptoms constant	-	+	+++
Psychosocial difficulties	-	++	+++
Health care use	+	++	+++

Management of IBS with predominant pain symptoms:

Various medications are used for treatment of this group of patients and the most effective treatments are as follows:

Anti-spasmodic drugs:

This group of drugs includes anti-muscarinic agents (e.g., Dicyclomine and Hyoscine), muscle relaxants other than anti-cholinergics

(e.g., Mebeverine and Pinaverium) and calcium channel blockers such as Colpermin and peppermint oil. Anti-spasmodic agents are used in the treatment of abdominal pain in IBS patients.[73] In a study comprising 905 subjects it has been shown that these agents were more effective with a response rate of 61% (505 out of 905 patients) in comparison to 34% (458 out of 873 patients) for a placebo subject group.[74-76]

Anti-depressant drugs:

Amitriptyline is one of the tricyclic anti-depressant drugs commonly used in the treatment of IBS patients at low doses (10mg per day).[77] Effects of this drug include visceral hyperalgesia, sleep improvement and normalization of intestinal transient time. When used in high doses (e.g., 100 mg or more at bed time) it may help to relieve depression and anxiety.[71] Two meta-analyses have shown that low to moderate doses of TCAs were more effective than placebo in relieving pain and general symptoms of IBS sufferers,[78,79] however a third meta-analysis rejected the previous findings and reported that TCA anti-depressants were no more effective than placebo. Some studies have shown that SSRI's have beneficial effects on patients affected by IBS,[80] and according to other studies these drugs are deemed effective in reducing abdominal pain relief in such patients.[78] SSRI's are effective pain relievers and reduce others symptoms such as fibromyalgia.[81,82]

Probiotics:

Probiotics have been shown to convey positive effects on intestinal motility, sensitivity and pain relief in IBS patients.[83,84]

Management of IBS with concomitant bloating:

Abdominal bloating, a symptom commonly witnessed in IBS patients, is often observed in constipation predominant IBS patients. Probable mechanisms of bloating may include:
i) Psychosocial,
ii) Weak abdominal muscles,
iii) Paradoxical relaxation of abdominal muscles and
iv) Changes in visceral sensitivity.

Antibiotics are effective in the improvement of bloating symptoms (Table 3). In cases where bacterial overgrowth has arisen, antibiotic treatment may be effective. Short-term antibiotic treatment is recommended to help improve bloating symptoms in IBS patients.[85] The use of non-absorbable antibiotics such as rifaximin leads to relief from symptoms of discomfort and bloating in IBS patients. Short-term use of rifaximin has been demonstrated to reduce bloating but relapse is often frequent.[86]

In a placebo controlled study, prescribing SSRI's such as Citalopram and Fluoxetine led to relief from bloating. These drugs may also convey anti-anxiety and anti-depressive effects.[80,87] A plant extract that contains *Coriandrum sutivum* and *Mentha spicata* has been shown to reduce bloating in IBS patients, as compared to placebo. This is probably achieved via its antispasmodic effects.[88] Table 3 lists a number of recommended medical therapies for bloating.

Management of IBS-constipation predominant:

Constipation is said to be a non-specific symptom witnessed in patients who possess an abnormal colon transient time or defecation disorder with an increase in straining.[72] In such patients treatment modalities are as follows:

The intake of fiber is highly recommended. Often consumption of roughly 12 grams of fiber daily has been shown to be relatively effective in reducing symptoms[89] although this effect is not regarded as being more than the effect that a placebo offers.[90] Osmotic laxatives are predominantly used for the treatment of constipation. Although no specific clinical trials on IBS patients have been conducted, yet fiber supplements are used in the treatment of constipation. This may cause an increase in bloating that often occurs as a side effect.[58]

Table 3: **Medicinal therapies used in the treatment of bloating and excess gas production.**

Medication class	Examples	Comments
Enzyme preparation	β-galactosidase	For treatment of lactose intolerance; variable effectiveness shown in lactose intolerant IBS patients.
	α-galactosidase	Effective when consuming legume-rich meals in healthy subjects.
	Pancreatic enzymes	Exact efficacy in the treatment of gas and bloating unknown.
Absorbents and agents that reduce surface tension	Simethicone	Possible benefits in functional dyspepsia and gas accompanied with diarrhea.
	Activated charcoal	Lack of certainty regarding the benefits in IBS.
	Bismuth subsalicylate	Possible benefits leading to a reduction of malodorous flatus.
Treatments used to modify the gut flora	Antibiotics	Useful for the treatment of bacterial overgrowth secondary to organic disease; possible benefits in IBS.
	Probiotics (*Lactobacillus* sp.)	Possible benefits in IBS.
	Prebiotics	Lack of certainty regarding the benefits in IBS.
Prokinetic medications	Tegaserod	Leads to a reduction of bloating in IBS.
	Neostigmine	Reduces bloating in IBS; however has been removed from market.
		Reduces luminal distention in acute colonic pseudo obstructed patients; exact benefits with regards to bloating unknown.

Long-term use of osmotic laxatives has been proven to be safe and effective. Magnesium, phosphate and emollients containing polyethylene glycols have also been shown to be efficient as well.[91]

Anti-depressants regardless of the type of effects they promote may be beneficial in IBS patients who suffer from abdominal pain and offer a therapeutic effect as well.[92]

In IBS, TCA's and probably SSRI's released endogenous endorphins and the blockage of norepinephrine reuptake leads to an increase in the inhibition of pain pathways.[93,94] In IBS patients the use of low dose anti-depressants is useful for effective pain relief and is well tolerated by patients in general. A double blind clinical trial has reported that low dose Amitriptyline (10 mg) conveyed effective pain relief in patients who suffer from IBS.[77] In IBS patients suffering predominantly from constipation; SSRI's (e.g., Fluoxetine 20 mg/daily) may help to relieve abdominal pain.[80] Serteralin at a dose of 100 mg per day or similar antidepressant drugs could be effective on any underlying depression.[95] In constipation predominant IBS patients, antidepressant drugs such as Amitriptyline, Imipramine and Nortriptyline should be used with caution.

Tegaserod is a 5-HT4 receptor agonist that in clinical trials has been reported to reduce the general symptoms of IBS patients in comparison to a tested placebo.[71] Lately, with subsequent testing it has been shown that Tegaserod may increase the risk of ischemic heart disease when compared to placebo, therefore the use of this drug was limited in September, 2007. As of July 2007 Tegaserod was only prescribed to women less than 55 years of age who suffer from IBS with predominant constipation symptoms and no apparent signs of cardiovascular disease.

Management of IBS-diarrhea predominant:

In this group of patients, anti-diarrheal agents are generally effective but few clinical trials have been conducted for confirmation. There is evidence which suggests that the use of regular low doses of anti-diarrheal agents (e.g., Lopramide every morning or BD) could be effective in such patients.[71]

A major double blind clinical trial has been conducted on diarrhea predominant IBS patients using Alosetron (5-HT3 antagonist receptor) in doses of 1 mg, twice daily for a period of 12 weeks. A reduction in the frequency and urgency of defecation, along with reduced abdominal pain and IBS symptoms have been shown, which will in turn help to improve the patient's quality of life.[96-98] The FDA has restricted the use of this drug to females affected by IBS who display major diarrheal symptoms.[99] Due to some adverse effects such as ileal obstruction, intestinal obstruction, rectal fecal impaction, intestinal perforation and ischemic colitis the use of this drug has subsequently been restricted by the FDA.[100]

Anti-depressants are effective in controlling abdominal pain and leading to diarrheal relief in diarrhea predominant IBS patients. TCA's are able to increase colon transit time through anti-cholinergic effects and may be useful in patients suffering predominantly from diarrhea.[77] Probitics have also been proven to be useful in diarrhea predominant IBS sufferers. A review of epidemiologic studies suggest the prevalence of IBS in Iran is among the lowest reported in neighboring developing countries and the Asian region, and is more common in females than males. For disease diagnosis, a careful history, physical exam and laboratory tests based on symptoms along with simultaneous observation of warning signs is very important. In these patients, the main goal is education and reassurance. Recommendations about dietary habits and drug therapy based on the primary IBS symptoms are recommended. Dietary changes should not disrupt the patient's quality of life.

CONFLICT OF INTEREST

The author declare no conflict of interest related to this work.

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