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Irritable Bowel Syndrome (IBS) Awareness among Primary Care Physicians and its Effect on Clinical Management, in Al-Khobar and Dammam Cities, Eastern Province, Saudi Arabia

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Abstract: ***Introduction: Primary care clinics are the first point of clinical contact for patients with unexplained gastroenterology symptoms. The lack of studies regarding irritable bowel syndrome (IBS) in Saudi Arabia warrants an assessment of primary care physicians' awareness of IBS and its clinical management. Objective: To evaluate primary care physicians' awareness of IBS diagnosis and management in the primary care setting, and to identify the influencing factors. Methodology: A cross-sectional, simple random study was conducted through an electronic self-administered questionnaire. Results: One hundred and one physicians were enrolled in the study. Agreement was achieved regarding the characteristics of IBS, although there was no consensus regarding the appropriate clinical diagnostic and management approach. Conclusion: Physicians showed an average awareness of IBS, with consultants and specialists being the most aware. Most clinicians are not following evidence-based guidelines for the diagnosis and management of IBS.***

Keywords: IBS, Awareness, Clinical Management, Primary care physicians, Primary health centers

1. Introduction

Irritable bowel syndrome (IBS) is a disorder of the lower gastrointestinal (GI) tract characterized by a multitude of GI symptoms including abdominal discomfort or pain [1], bloating or feeling of abdominal distension, alterations in bowel habits (constipation and/or diarrhea), and altered stool passage (urgency or feeling of incomplete evacuation)[2]. Diagnosis of IBS depends on symptom-based criteria such as the Rome III criteria, after excluding the presence of any organic GI diseases [3].

The prevalence varies according to country and criteria used to define IBS [4], and ranges from 5.8% to 26.1% in the general population [5]. Much of the variability in prevalence rates is probably due to different symptom-based diagnostic criteria, sample selection, access to health care, and/or cultural factors [6]. IBS is more frequent in women than in men, and its prevalence is less for individuals aged over 50 years, when compared with those of less than 50 years [7-8].

IBS accounts for approximately 12% of visits to primary health care (PHC) physicians, and it is the most common reason for referral to gastroenterology clinics (28%) [9-10].

Although it is among the most common disorders in gastroenterology and primary care practices, IBS continues to present clinicians with a substantial diagnostic challenge [5-14-17-18-19-20-21-22];indeed, the diagnosis of IBS is frequently missed or delayed [16].The absence of biological markers for the diagnosis of IBS or even its characterization as a mental illness could lead to inadequate interpretation [16].Many patients with IBS have bounced around the field of medicine for many years with different diagnoses, due to lack of interest or deep frustration of the doctor in the treatment of IBS [16].Furthermore,many doctors consider IBS as a mixture of different organic diseases, while others believe that IBS does not exist as one clinical entity, but rather that the symptoms that patients experience are normal and not medical priority. In fact, only a few doctors consider IBS as a functional bowel disease as defined by the biopsychosocial model [5-18-23-24-25].Reports and guidelines emphasize that IBS is not a diagnosis of exclusion and encourage clinicians to make a positive diagnosis using the Rome Criteria alone [5-18-20-24-25-26-27-28].

However, it has been reported that up to 72% of physicians from different specialties in the United States (US) (GI, internal medicine, and primary care) still consider IBS as a diagnosis of exclusion, which leads to over prescription of diagnostic tests and increases medical costs unnecessarily [29].

The path for IBS diagnosis is through the PHC physician and it can be achieved without additional testing beyond careful history taking, general physical examination, and routine laboratory studies (not including colonoscopy). In patients whose symptoms meet the standard diagnostic criteria and who do not have the warning signs [14-30-31],diagnosis can be based upon the Rome Criteria [16].If patients have a history of IBS or colorectal cancer, then further diagnostic tests will be required to rule out more serious pathology[16].

Although there is currently no cure for IBS, a number of treatment modalities exist for control of mild, moderate, or even severe symptoms [10].The therapeutic goal for all cases of IBS must focus on the overall well-being of the patient, including abdominal symptoms and the accompanying non-bowel symptoms [33]. It is important to establish an effective physician-patient relationship and to reassure the patient once the diagnosis of IBS is made in order to ensure

effective management [34]. It is also important that patients are educated about the multidisciplinary treatment options for IBS, which include dietary treatment, lifestyle therapy, behavioral therapy, and pharmacologic therapy [33].

Psychological treatment and antidepressants should be considered when IBS symptoms are severe or refractory or associated with psychological distress and impaired quality of life [34].

Development of efficient diagnostic and management strategies of IBS will improve patient's quality of life and reduce unnecessary investigations and hospital referrals which are associated with substantial human and economic costs [26-37].

Patients should be informed that the nature of the disease is chronic, benign, and educated on how to deal with and control symptoms, which vary periodically from mild to severe and have many negative effects on quality of life [28]. Patients should also be informed that their diagnosis is not life-altering and, that, with appropriate medical care and symptom control, leading a normal and healthy life is possible [28].

2. Literature Review

Knowledge of Symptoms and Diagnostic Criteria

In a study conducted in Saudi Arabia (2012), 97% of primary care physicians (PCPs) recognized abdominal pain as a symptom of IBS, followed by 83% for altered bowel habit and 77% for bloating [39].

In a survey of general physicians (GPs) in the United Kingdom and the Netherlands (2008), GPs defined IBS as a combination of symptoms with no explained organic cause, focusing on changed defecation patterns and abdominal pain. Many described the condition as a defect of the bowel, referring to the organ as 'angry' or 'disordered' in its reaction to stimuli, such as food and stress. Most doctors realized that they did not know what causes IBS, although they named factors associated with the disease [41].

A study in San Diego (2003) showed that US family practitioners lacked knowledge that could interfere with patient care. A single class improved short-term knowledge but had little effect on attitudes about IBS [42].

Diagnostic Confidence

Several lines of evidence suggest that most PCPs consider IBS to be a diagnosis of exclusion (i.e., organic causes should be excluded before diagnosing IBS). These include structured interviews where this view was given by PCPs (2009 and 2013) [43-44],including one study (2010) in which 72% of PCPs expressed this view [45].

A peer-reviewed literature search of the PubMed database was conducted for primary reports and reviews using the limiters of date (1999–2009), and this found that there is a discrepancy between practice guidelines and clinical practice.

In a survey of Spanish gastroenterologistsconducted in 2011, in which clinicians were asked about their overall diagnostic approach, 5% of the respondents preferred to follow a symptom-based strategy, 55% always prescribed a diagnostic test to rule out structural diseases, and, finally, 40% requested a diagnostic test only in the presence of alarming symptoms or in subjects older than 50 years [1-9].

One study conducted in 2012, which enrolled general physicians and gastroenterologists in Iceland, found that only two-thirds of all physicians were aware that special diagnostic criteria exist for defining and diagnosing IBS. When physicians were asked if they knew of the IBS diagnostic criteria, 71% said yes (64% of GPs, 100% of SGs)[56]. Despite the fact that 64% of GPs claimed they knew that diagnostic criteria existed, only 10% had heard of the Manning criteria, 27% of Rome I, and 17% of Rome II [47].

In preliminary data from a Romanian province, all general physicians (100%) opted for colonoscopy to diagnose IBS. The majority (98.8%) relied on the use of the Rome II criteria for the diagnosis of IBS (this survey was done before the availability of Rome III)[48].

According to the aforementioned study of UK and Danish GPs, some doctors relied on particular symptoms to confirm an IBS diagnosis; for example, several indicated that an alternating bowel habit (as opposed to constipation or diarrhea alone) was necessary for an IBS diagnosis. GPs also spoke of certain 'triggers' that suggest the type of patient likely to suffer from IBS: female sex, episodic complaints, and frequent consultation (especially for complaints like a headache and fatigue) [41].

A study conducted in Saudi Arabia (2012) found that less than 1/4th of the physicians surveyed use "Rome or Manning criteria" to facilitate IBS diagnosis and physicians with a master's degree use these tools more than residents [3].Among the physicians surveyed, 21.5% diagnosed IBS by history taking and physical examination, 13.9% by history taking alone, and the remainder relied on history taking along with physical examination and laboratory investigations. In the same study, it was found that 35.4% of physicians were not sure about how to diagnose IBS. Also, 46.2% requested tests including complete blood count with erythrocyte sedimentation rate (ESR), stool examination, colonoscopy, and abdominal radiologic imaging [39].

Management Approaches

In terms of management goals for pharmacotherapy, Bijkerket al. (2003) found that 70% of Dutch PCPs considered global symptom improvement to be their main aim, while 28% aimed mainly to improve predominant IBS symptoms, and 2% aimed mainly to improve patients' quality of life [49].

In a systematic review study of the Rome Foundation Working Team, 93% of respondents said they provided dietary advice to their patients, 77% used counseling, 63% provided routine lifestyle advice, 55% prescribed drug therapy, and 4% provided behavioral therapy [49].

UK PCPs in the study by Casidayet al. (2009) stated that their main focus was managing symptoms and reassuring patients with IBS [43].

In a survey of Spanish gastroenterologists in 2011, 80% of the physicians surveyed initiated empirical treatment, while 18% always waited until they received the results of diagnostic tests, and 2% did not follow any particular rule [9]. According to the study done on GPs in the UK and Netherlands (2008), GPs focused on managing symptoms and reassuring patients. Many GPs felt that patients needed to take the responsibility for managing their IBS and for minimizing its impact on their daily lives. However, the GPs had limited awareness of the extent to which IBS affected their patients' daily lives [41].

A study conducted in Saudi Arabia (2012) found that 34.4% of physicians with a master's degree and 6.5% of residents suggested limitations in the PHC setting as a contributing factor to the lack of effective management of IBS [3]. In the same study, around half of the physicians surveyed prescribe herbal medicine for IBS patients; and this may be because several herbal therapies can be recommended as part of an evidence-based approach for the treatment of IBS [39].

Referral Rates/ Follow Up

In the European survey by Seifert et al. (2008), the proportion of PCPs who would seek specialist referral before making a diagnosis of IBS was 7% in the Netherlands, 10–15% in England, 15–20% in Spain, and 25–32% for Greece, Poland and the Czech Republic [50].

In the survey of Spanish gastroenterologistsmentioned previously, 88% of the gastroenterologists reported that primary care should be responsible for most patients' follow up, while 11% considered that this should be a responsibility of a gastroenterology specialist [9].

In the study conducted in Saudi Arabia (2012), we found that more than half of the physicians surveyed continued providing their IBS patients with continuity of care, while 40% referred IBS patients to specialist care either immediately or later [39].

3. Methodology

Setting and population

Between January 1st and April 20th, 2017, a descriptive cross-sectional study was performed that included all primary care physicians in Al-Khobar and Dammam primary care centers of Ministry of Health, Eastern Province, Saudi Arabia.

Sampling

A simple random sampling was conducted through electronic self-administered questionnaires.A link tothe questionnaire was sent through direct contact messages and emails to a total of 57 physicians in Al-Khobar primary centers, and 123 physicians in Dammam primary centers. Physicians provided informed consent prior to study enrolment, and they were allowed to refuse to participate in the study.

Data collection tool

The tool used in this study has been used in a previous study conducted in Spain and published in 2007 [55] and updated to be used in another study by the same authors[9]. We contacted the authors through email and received permission to use their questionnaire in the current study. As the original questionnaire was in Spanish, we translated the questions into English and modified the questionnaire slightly based on our study objectives (e.g., we deleted those items unrelated to our study objectives).

The questionnaire contains 18 items divided into the following four main sections: I) demographic characteristics; II) general awareness of IBS; III) diagnostic approach to IBS; and IV) management approach to IBS.

Ethical considerations

Approval from the Ethical Committee of the Post-graduate Saudi Board Program, Eastern Province, was gained before conducting the study.Participants were informed that participation in the study was completely voluntary, and all personal information would be kept confidential.

Validity and reliability

A pilot study was conducted on twenty-two (22) primary care physicians at other cities of the Eastern Province. Afterward, the questionnaire was adjusted based on their opinions and suggestions, and reviewed by the authors of this study. A Cronbach's alpha of all variables was calculated using the Statistical Package for Social Science software (SPSS) 23rd version.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.935	130

Analysis

We performed a descriptive analysis of the subject's responses. Chi-square test was used for categorical association with the level of awareness. Significance was determined at p-value <0.05.

The level of awareness

We obtained the responses of the five-scale agreement questions (1=strongly agree, 2=agree, 3=somewhat agree, 4=disagree, 5=strongly disagree) and re-coded into different variables to create a three-scale awareness level (1=high, 2=average, 3=low):

If the correct answer was strongly agreed:

Old Values	New Values
1	**1**
2,3	**2**
4,5	**3**

If the correct answer was strongly disagreed:

Old Values	New Values
5	**1**
3,4	**2**
1,2	**3**

The overall awareness of signs/symptoms and alarming signs of IBS were calculated by summation of the results of high awareness, average awareness, and low awareness separately and divided by its total number.

4. Results

One hundred and three (n=103)physicians responded, and two were excluded because they did not meet the inclusion criteria.

Demographic Data

Most of the participating physicians were females (65.3%), Saudi nationality (94.1%) with MBBS degreesobtained from universities in Saudi Arabia (80.2%), and aged between 30-40 years (57.4%). The majority (69.3%) of physicians had 2-10 years of clinical experience, and most were unspecialized general physicians (39.6%), followed by residents (27.7%) and specialists (23.8%).

Physicians' awareness of IBS:

Seventy-two percent (72.3%) of physicians agreed that IBS has a separate identity as a disease rather than a manifestation of other diseases and agreed that the identification of warning signs in their patients is essential to rule out an organic disease before considering the diagnosis of IBS.

Figure 1 illustrates physician views regarding duration of symptoms which appears to be a crucial factor when making a diagnosis of suspicion.

Sixty-seven percent (67.3%) of physicians were aware of the classification of IBS into subgroups according to the presenting symptoms (IBS-D, IBS-C, and IBS-M), and (93.1%) believed that the therapeutic choices of IBS are dependent on the presenting symptoms of patients.

Tables1 and 2 demonstrate the level of awareness of signs/symptoms and alarming signs of IBS.

Figure 1: The duration of symptoms is a crucial factor when making a diagnosis of suspician.

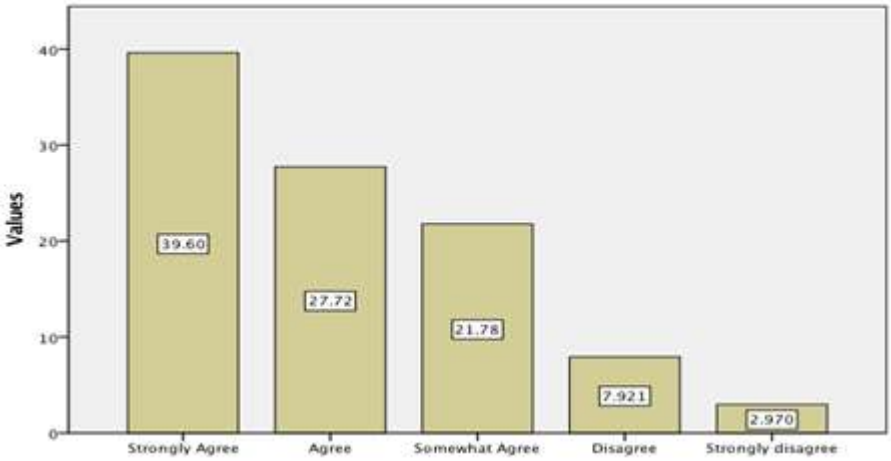


Table 1: Level of awareness of signs/symptoms of IBS

Signs/Symptoms	*High*	*Moderate*	*Low*
Abdominal pain	**62.40%**	30.70%	6.90%
Flatulence	60.40%	34.70%	5.00%
Bloating	61.40%	30.70%	7.90%
Increase number of bowel motions	35.60%	57.40%	6.90%
Presence of mucus in stool	17.80%	56.40%	25.70%
Decrease frequency of stool	27.70%	53.50%	18.80%
Difficulty defecation	7.90%	43.60%	48.50%
Defecation urgency	23.80%	39.60%	36.60%
Tenesmus (Painful defecation)	11.90%	36.60%	**51.50%**
Pain relieved with defecation	**53.50%**	26.70%	19.80%
Increase pain after meals	18.80%	56.40%	24.80%
Pain relieved with flatulence	10.90%	36.60%	**52.50%**
Anxiety	45.50%	50.50%	4.00%
Depression	28.70%	57.40%	13.90%
Arthromyalgia	4.00%	40.60%	**55.40%**
Chest pain	42.60%	43.60%	13.90%
Heartburn	5.90%	50.50%	43.60%
Overall Awareness	30.50%	**43.90%**	25.60%

Table 2: Level of Awareness of Alarming Signs of IBS

Signs/Symptoms	High	Average	Low
Rectal bleeding	58.40%	12.90%	28.70%
Anorexia	**43.60%**	38.60%	17.80%
Fatigue	6.90%	38.60%	**54.50%**
Fever	**50.50%**	18.80%	30.70%
Significant weight loss	**60.40%**	18.80%	20.80%
Nocturnal diarrhea	31.70%	38.60%	29.70%
Ribbonlike stool	13.90%	46.50%	39.60%
Vomiting	8.90%	46.50%	44.60%
Rectal tenesmus	9.90%	46.50%	43.60%
Bloating (Abdominal distension)	16.80%	43.60%	39.60%
Family history of colon cancer	51.50%	24.80%	23.80%
Family history of IBD	48.50%	27.70%	23.80%
Age more than 50 years	**56.40%**	22.80%	20.80%
Anemia	47.50%	31.70%	20.80%
Male sex	12.90%	49.50%	37.60%
Recent antibiotic use	16.80%	39.60%	43.60%
Short history of symptoms	18.80%	42.60%	38.60%
Overall Awareness	32.60%	**34.60%**	32.90%

Associations

Does IBS have a separate identity as a disease rather than a manifestation of other diseases?
Cross-tabulation results with qualification showed that a total of 73 physicians consider IBS as separate disease rather than as a manifestation of another disease (p = 0.039).

Signs/symptoms of IBS awareness:
Based on (abdominal pain symptom) * (qualification) cross-tabulation results**,** 63 (62.4% within qualification) physicians showed a high level of awareness of considering abdominal pain as a symptom of IBS (p = 0.002)**.**

Based on (pain relieved after defecation symptom) * (qualification) cross-tabulation results**,** 54 (53.5% within qualification) physicians showed a high level of awareness when considering pain relieved after defecation as a symptom of IBS (p = 0.003)**.**

Alarming signs of IBS awareness:
Based on (rectal bleeding sign) * (qualification) cross-tabulation results**,** 59 (58.4% within qualification) physicians showed a high level of awareness of considering rectal bleeding as an alarming sign of IBS (p = 0**.030**).

Based on (anorexia sign) * (qualification) cross-tabulation results**,** 44 (43.6% within qualification) physicians showed a high level of awareness of considering anorexia as an alarming sign of IBS (p = 0**.012**).

Based on (significant weight loss sign) * (qualification) cross-tabulation results**,** 61 (60.4% within qualification) physicians showed a high level of awareness of considering significant weight loss as an alarming sign of IBS (p = 0**.011**).

Based on (family history of colon cancer) * (age) cross-tabulation results**,** 52 (51.5% within qualification) physicians showed a high level of awareness of considering family history of colon cancer as an alarming sign of IBS (p = 0**.010**).

Based on cross-tabulation results**,** 57 (56.4% within qualification) physicians aged > 50 years showed a high level of awareness of considering age more than 50 as an alarming sign of IBS (p = 0**.026**).

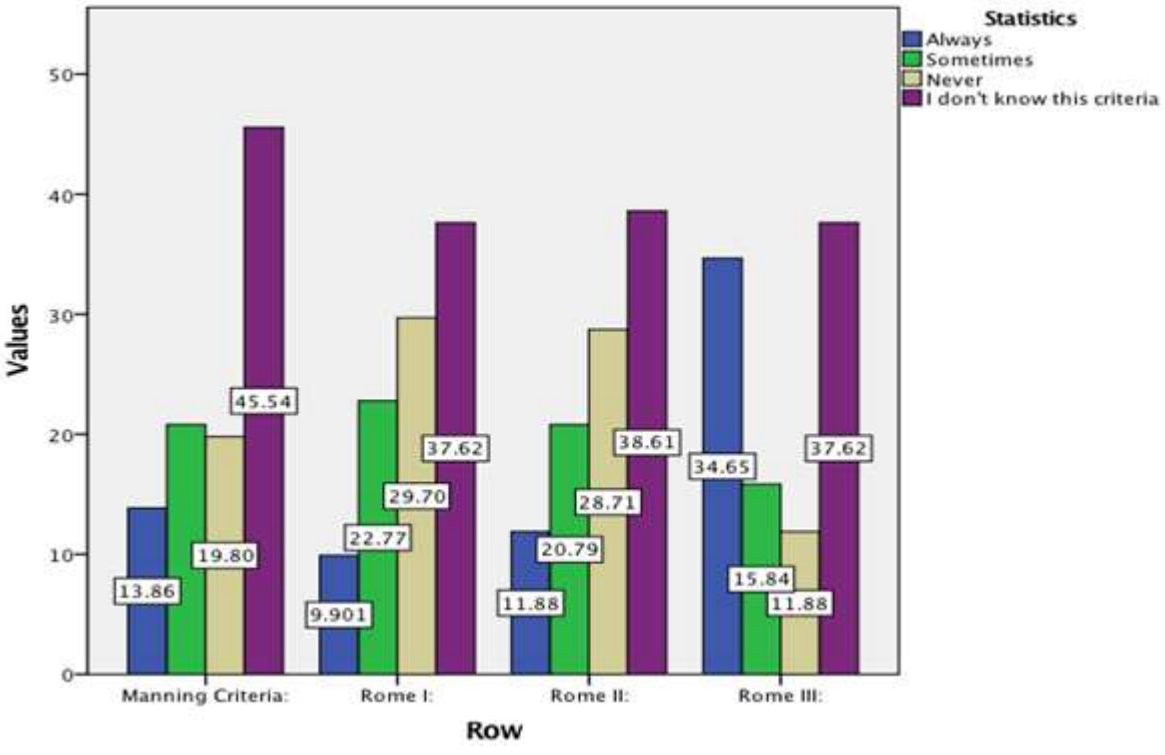
Identification of warning signs to rule out an organic cause before considering the diagnosis of IBS:
Cross-tabulation results with qualification showed that 73 (72.3% within qualification) physicians showed a high level of awareness with regards to ruling out organic causes before considering the diagnosis of IBS (p = 0**.042**).

Classification of IBS:
Cross-tabulation results with qualification showed that 68 (67.3% within qualification) physicians showed awareness regarding the classification of IBS into clinical subgroups based on the predominant symptom (p <0**.001**).

Therapeutic options for IBS:
Cross-tabulation results with age showed that 94 (93.1% within gender) physicians showed awareness with regards to treating patients with IBS depending on the presenting symptoms (p = 0**.016**).

Diagnostic approach:
Various universally applicable clinical criteria exist to confirm the diagnosis of IBS; we asked physicians how often they relied on these criteria to diagnose IBS in their patients (Figure 2).

Figure 2: Proportion of physicians that know and use the different clinical criteria of IBS.



Diagnostic tests used by physicians based on whether or not patients have alarming signs (Table 3) and (Table 4)

Table 3: In a patient with IBS without alarming symptoms of IBS, before you make the diagnosis, would you consider requesting these investigations?

Investigations	Always	Sometimes	Never
No need for any investigations if the patient meets the criteria for IBS	**39.6%**	**42.6%**	17.8%
Basic blood tests	**42.6%**	37.7%	19.7%
Acute phase reactants; iron study	14.8%	**45.9%**	39.3%
Gliadin antibodies andantiglutaminase	3.3%	34.4%	**62.3%**
Thyroid hormones	13.1%	**57.4%**	29.5%
Stool analysis	**37.7%**	**41.0%**	21.3%
Clostridium difficile toxin	9.8%	24.6%	**65.6%**
Fecal occult blood	**32.8%**	47.5%	19.7%
Intestinal transmit study	6.6%	18.0%	**75.4%**
Barium enema	6.6%	23.0%	**70.5%**
Video capsule endoscopy	6.6%	19.7%	**73.8%**
Colonoscopy	**9.2%**	**44.7%**	**44.7%**

Table 4: If the same patient with IBS presented with alarming symptoms of IBS, would you consider these investigations before you make the diagnosis?

Investigations	Always	Sometimes	Never
No need for any investigations if the patient meets the criteria for IBS	18.8%	33.7%	**47.5%**
Basic blood tests	**72.5%**	18.7%	8.8%
Acute phase reactants; iron study	**47.8%**	31.1%	21.1%
Gliadin antibodies and antiglutaminase	28.1%	32.6%	**39.3%**
Thyroid hormones	37.4%	**42.9%**	19.8%
Tumor markers	27.8%	**36.7%**	**35.6%**
Stool analysis	**65.9%**	23.1%	11.0%
Clostridium difficile toxin	14.8%	**44.3%**	**40.9%**
Fecal occult blood	62.6%	26.4%	11.0%
Abdominal ultrasound	35.2%	**45.1%**	19.8%
Intestinal transmit study	9.9%	33.0%	**57.1%**
Barium enema	18.7%	34.1%	**47.3%**
Video capsule endoscopy	18.7%	34.1%	**47.3%**
Colonoscopy	**37.4%**	**40.7%**	22.0%

Management approach

Physicians were surveyed regarding the management approach for patients diagnosed with IBS based on clinical criteria; (44.6%) of physicians responded that would **always** give empirical treatment without any further complementary studies, while (48.5%) would **sometimes** give an empirical treatment without any further complementary studies. The duration of treatment preferred by the latter physicians is shown in Table (5).

Table 5: Duration of empirical treatment of IBS

Duration of treatment	Frequency	Valid%
1 to 2 weeks	13	12.9
2 to 4 weeks	**57**	**56.4**
4 to 8 weeks	14	13.9
2 to 3 months	1	1
3 to 6 months	1	1
As needed	8	7.9

A minority (6.9%) of physicians responded that would **never**treat empirically without any further complementary studies.

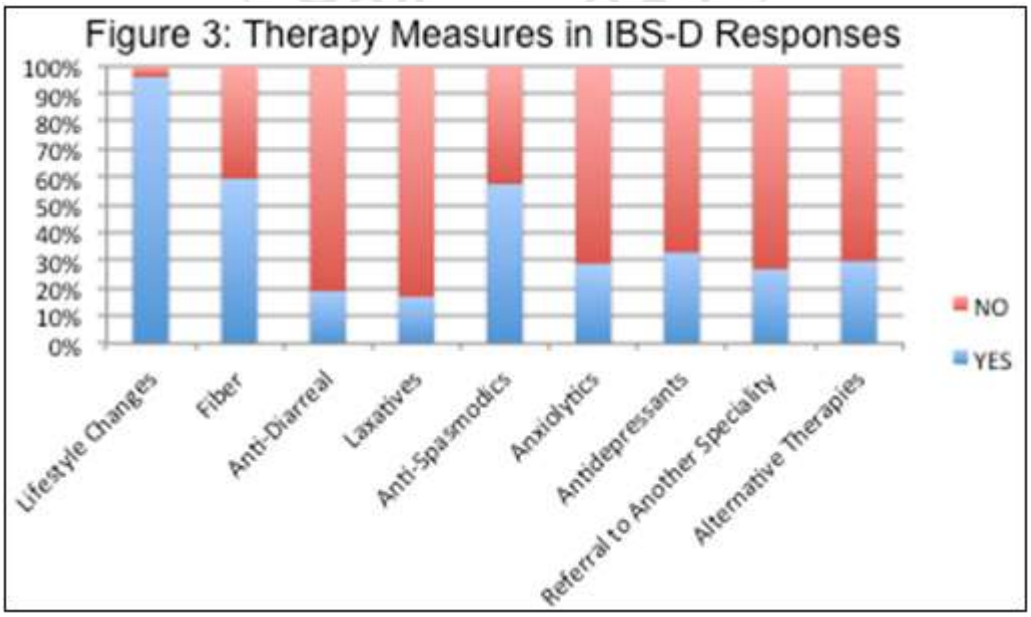
If patients are not responding to empirical treatment:

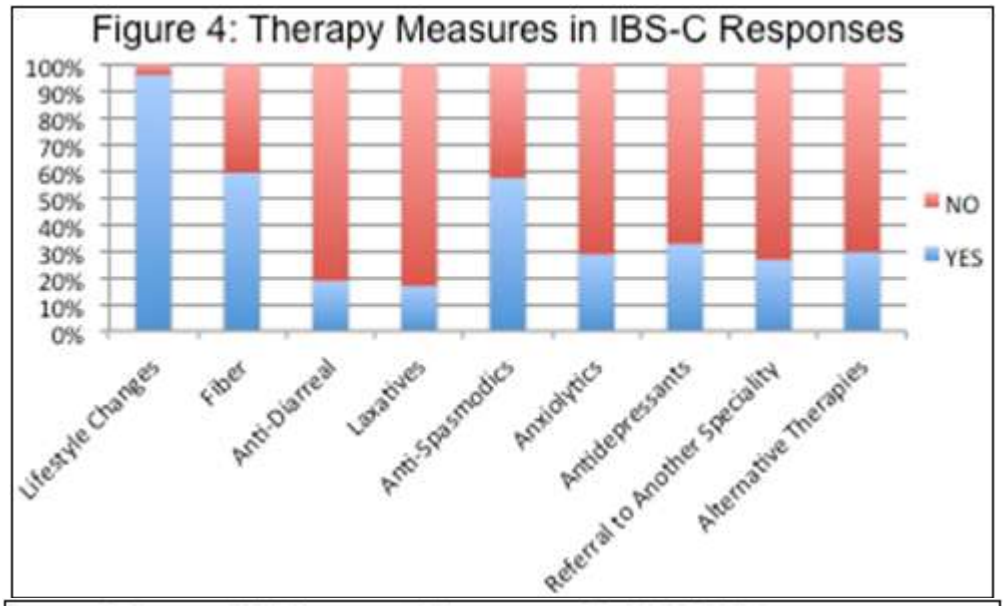
Thirty percent (30.3%) of physicians would always reconsider the diagnosis of IBS; while 67.7% would sometimes consider another diagnosis of IBS, and 2.0% would never re-considering another diagnosis.

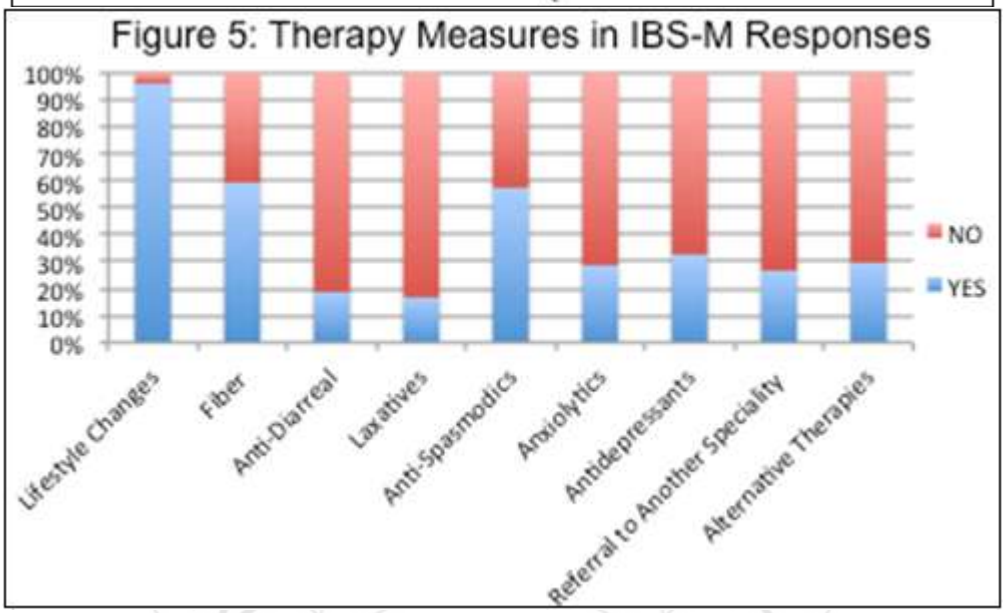
Forty-two percent (42.6%) would always try an alternative therapy for their patients with IBS, while 49.5% responded sometimes, and 7.9% would never try an alternative therapy.

Therapy Measures for different types of IBS:

Physicians' responses are demonstrated in Figures 3, 4, and5.







Follow up:
Once the diagnosis and treatment are confirmed, 84.2% of physicians believe that IBS patients need to continue to be followed up, while 11.9% responded that this is not necessary, and 4.0% responded not sure. Four percent of physicians believe that primary care physicians are responsible for the follow up of IBS patients, 5.9% believe that gastroenterologists are responsible for follow up, and most (36.6%) believe that both primary care physicians and gastroenterologists are responsible for patient follow up.

5. Discussion

IBS is a common functional gastrointestinal disease; it is still poorly understood and underestimated in Saudi Arabia. Primary care physicians are the first point of contact for patients with IBS, many of whom are not accurately diagnosed and managed [39].

There are limited studies about primary care physicians' awareness of IBS in Saudi Arabia. Only one study in the Northern region studied the knowledge, attitudes, and practice among primary care physicians in Al-Jouf city, but this study did not explore how IBS awareness among primary care physicians affects their clinical management. Also, IBS awareness campaigns and seminars are limited with no clear guidelines for diagnosing and managing IBS in Saudi Arabia [39].

IBS is a chronic benign disease with no specific symptoms and uncertain pathophysiology, and, therefore, many physicians struggle to accurately diagnose IBS when faced with patients with multiple symptoms with no organic basis. The current study surprisingly showed that the majority of physicians (72.3%) agreed that IBS is its own disease entity, as opposed to a manifestation of other diseases, and that physician qualification was significantly associated with the high level of awareness, with consultants being the most aware (100%),followed by specialists (79.2%), residents (75%), and general unspecialized physicians (60%).
While a number of previous studies suggested that most primary care physicians consider IBS to be a diagnosis of exclusion [43-44-45], our study showed that the majority of physicians believe that the identification of warning signs in their patients is essential to rule out an organic disease before considering the diagnosis of IBS (72.3%), and that

specialists were significantly aware (91.7%) compared to residents (78.6%), consultants (66.7%), and general physicians (57.5%). Moreover, most physicians (67.3%) are familiar with the classification of IBS subgroups according to the presenting symptoms (IBS-D, IBS-C, and IBS-M), with consultants being most aware (100%), followed by specialists (91.7%), residents (75%), and general physicians (40%).

Similar to many updated guidelines for the management of IBS, almost all the physicians surveyed agree that the therapeutic choices for IBS are dependent on patients' presenting symptoms, which is in agreement with the results of a prior survey conducted on Spanish gastroenterologists in (2011) [9].Significantly, female physicians were more aware than males about a symptom-dominant treatment strategy for IBS.

IBS has many signs and symptoms that could present differently among patients, and some of these signs and symptoms could be alarming. In this study, physicians showed an overall average level of awareness of some characteristics of IBS, with consideration of cardinal symptoms of IBS including abdominal pain and pain relieved by defecation. Physicians' qualification was strongly associated with a high level of awareness of both symptoms, and with regard to awareness about abdominal pain, consultants were most aware (88.9%), followed by specialists (83.8%), residents (67.9%), and general unspecialized physicians (40%). Regarding pain relieved by defecation, specialists were significantly aware (79.2%), followed by residents (77.8%), consultants (50%), and lastly general physicians (35%), (Table 1).

Physicians showed an overall average level of awareness of the alarming signs of IBS, but they had a high level of awareness of the following alarming signs: significant weight loss (60.4%), rectal bleeding (58.4%), age more than 50 years (56.4%), family history of colon cancer (51.5%), and fever (50.5%), (Table 2). Physician qualification was strongly associated with a high level of awareness of the following alarming signs: rectal bleeding, anorexia, significant weight loss, and age more than 50 years. Specialists were most aware of the aforementioned alarming signsfollowed by consultants, residents, and general physicians. However, the age of physicians seemed significantly associated with considering afamily history of colon cancer as an alarming sign of IBS, with the age group "30-40 years" being the most aware, followed by the age group "more than 50 years", "less than 30 years" and "40-50 years".

Unexpectedly, years of experience of the participating physicians were not significantly associated with the level of awareness of IBS. It is generally expected that as long as the physicians practice the management of a particular disease, they should be aware of that disease.

6. Approach to diagnosis

Over decades, there have been many established diagnostic criteria for IBS including the Manning criteria, Rome I, Rome II, Rome III, and the most recent Rome IV criteria. Diagnosis of IBS using the Rome IV criteria (May 2016) requires the presence of recurrent abdominal pain over an average of at least 1 day per week during the previous 3 months and which is associated with 2 or more of the following: (1) related to defecation, (2) associated with change of frequency, and (3) associated with change in stool form or appearance [56]. In the current study, we asked primary care physicians if they are aware of and how frequently they use the Manning criteria, Rome I, Rome II, and Rome III criteria. Unfortunately, most of the physicians did not know any of the diagnostic criteria for IBS; among those that did, the Rome III criteria was the most commonly used (Figure 2) (our study was done before Rome IV criteria was issued). In contrast, a study conducted in Saudi Arabia (2012), found that less than one quarter of the physicians surveyed use the "Rome or Manning criteria" to facilitate IBS diagnosis, and that physicians with a master's degree use these tools more than residents [3].

Moreover, in this study, we explored diversity in physicians' use of diagnostic tests in patients with IBS based on the presence or absence of alarming signs. In a patient with IBS without alarming signs, 39.6% of physicians believe there is no need for any further investigations, while (42.6%) reported that they would sometimes order some basic tests. The most commonly used investigations were complete blood counts (42.6%), stool analysis (37.7%), and fecal occult blood (32.8%). Even in the absence of alarming signs, physicians would consider certain investigations, including assessment of thyroid hormones (57.4%), acute phase reactants, iron study (45.9%), and colonoscopy (44.7%) (Table 3). Previous studies have suggested that the specificity of the Rome III criteria may be improved by including information about nocturnal stools, somatization, history of affective disorders obtained from a thorough clinical history, hemoglobin and c-reactive protein levels, and other diagnostic tests [57-60]. Interestingly, the 2009 American College of Gastroenterologists (ACG) evidence-based position statement on the management of IBS does not recommend laboratory testing or diagnostic imaging in patients younger than 50 years with typical IBS symptoms and without alarming signs [58]. Patients aged more than 50 years should have more extensive testing, including a colonoscopy [58]. In contrast, preliminary data from a Romanian province reported that all general physicians (100%) considered colonoscopy to be necessary for the diagnosis of IBS [48].

Celiac disease is associated with IBS as it often presents with similar symptoms and clinical presentation. In a meta-analysis of 14 studies conducted on adults diagnosed with IBS, celiac disease was four times more common in patients with IBS than in controls without IBS [59]. However, while routine screening for celiac disease in all patients with IBS is very controversial [60], the 2009 ACG recommends serologic testing for celiac disease in patients with IBS-D and IBS-M [58]. In this study, a majority of physicians (62.3%) would never test for celiac disease antibodies in the absence of alarming features, and a minority (39.3%) would not test even in the presence of alarming features (Tables 3, 4).

In the case of a patient with IBS but no alarming signs,

47.5% of physicians responded that there was no need for any further investigations.This percentage was expected to be lower for patients without alarming signs, and we attributed it to the observation that physicians had misunderstood the question in the questionnaire. The most common investigations considered by physicians in these patients included complete blood count (72.5%), stool analysis (65.9%), fecal occult blood (62.6%) and acute phase reactants, iron studies (47.8%), and colonoscopy (37%). Investigations that would sometimes be considered by physicians in the presence of alarming signs included abdominal ultrasound (45.1%), thyroid hormones (42.9%), clostridium difficile toxin (44,3%), colonoscopy (40.7%) and tumor markers (36.7%) (Table 4).

7. Management Approach

In the survey of Spanish gastroenterologistsmentioned earlier (2011), 80% of the physicians initiated empirical treatment, compared to only 44.6% of physicians in our study who reported they would always initiate empirical treatment, and 48.5% who reported they would only sometimes treat empirically without any further complementary investigations. The majority reported that the duration of empirical treatment should continue for 2-4 weeks (Table 5).

Many patients are interested in dietary manipulation to decrease their symptoms. Several different diets have been proposed [61]. Foods contribute to the pathogenesis of IBS through multiple mechanisms, but emerging data suggest that bacterial fermentation of food in the gut is a key factor in symptom generation [62]. High-FODMAP foods (referring to Fermentable, Oligosaccharides, Disaccharides, Monosaccharides, and Polyols) can precipitate symptoms of IBS but are not the underlying cause of IBS; a low-FODMAP diet removes the precipitating factor in many patients, and symptoms resolve unless FODMAP foods are reintroduced [62]. Consultation with a dietitian can be very beneficial, as long as the dietitian knows about the current literature regarding the low-FODMAP diet and the use of gluten withdrawal for the treatment of IBS [62].

In a systemic review study by the Rome Foundation Working Team, 93% of respondents said they provided dietary advice to their patients, while 77% used counseling and 63% provided routine lifestyle advice [49]. In a 2012 study conducted in Icelandon both general physicians and gastroenterologists, physicians reported in most cases that they would give advice on diet and education in order to manage IBS symptoms [47]. Similarly, in the current study, physicians use various treatment options depending on the type of IBS (i.e., the predominant symptoms), with all physicians agreeing that lifestyle modifications (i.e., dietary modifications) are the most therapeutic measures regardless of the type of IBS, while anti-diarrheal agents are useful for IBS-D, and fiber supplements with anti-spasmodic for IBS-C (Figures 3, 4, 5). An increase in fiber intake is often recommended, and although the efficacy of fiber supplements has not been proven, some improvement has been demonstrated in patients with IBS whose primary complaints are abdominal pain and constipation [63].

In a study conducted in Saudi Arabia (2012), around half of the physicians surveyed prescribed herbal medicine for IBS patients; and this may be because several herbal therapies can be recommended as part of an evidence-based approach for the treatment of IBS [39]. In contrast, only 20-30% of physicians in this study would consider alternative therapies including herbal agents, relaxation techniques, and meditation.

Regarding the use of psychological interventions in irritable bowel syndrome, the coexistence of psychological disturbances with IBS, particularly in patients with more severe symptoms who seek medical care, and,given the effect of antidepressants on reducing gut sensation, and the fact that their neuromodulatory analgesic effect is unrelated to their psychotropic effects, antidepressants can be used in IBS patients with or without psychiatric comorbidity (e.g., depression, anxiety) [64]. A recent meta-analysis of 12 studies concluded that antidepressants are effective in IBS patients [65], but, although the available data suggest that psychological therapies may be of comparable efficacy, there is less high-quality evidence for the routine use of psychological therapies in patients with IBS [66]. In this study, only 30% of physicians consider antidepressants in the management of IBS patients regardless of patients' predominant symptoms.

In a survey of Spanish gastroenterologistsconducted in 2011, 88% of the gastroenterologists considered that primary care physicians should be responsible for most patients' follow up [9]. This is in contrast to the results of our study in which only 4% of primary care physicians believe that they should be responsible for the clinical follow up of IBS patients, with 5.9% believing that gastroenterologists should hold this responsibility and most (36.6%) believing that both primary care physicians and gastroenterologists should be responsible for the follow up of IBS patients. This might be explained by the lack of clinical resources in the primary care setting,which results in referrals to specialist care having to be made eventually.In agreement with our results, the study conducted in Al-Jouf, Saudi Arabia (2012) found that more than half of the primary care physicians surveyed assumed the responsibility of continuity of care for IBS patients;however, unfortunately, 40% of those physicians referred IBS patients either immediately or later [39].

8. Conclusion

- Primary care physicians show an average understanding of IBS.
- Qualification of physicians is a main determining factor for awareness of IBS regardless of the years of experience, with consultants and specialists being more aware than non-specialized physicians.
- According to this study, physicians'practice to diagnose and manage IBS patients is influenced by limited facilities at the primary care setting.
- Almost all physicians recommendthe evidence-based practice of diet modification in the management of their IBS patients.

- Despite the effectiveness of antidepressants in the treatment of IBS symptoms, a minority of physicians would prescribe them for IBS patients.

Advantages

- There are a limited number of prior studies that evaluated the awareness of physicians, and especially of primary care physicians, on the management of patients with IBS in Saudi Arabia; therefore, the contribution of this study is invaluable.
- Our study highlights a very common and underestimated disease in Saudi Arabia, and highlights all clinical aspects and influencing factors which give us a clear snapshot of the level of awareness among physicians.
- The tool we used in this study has been used in two previously published studies [9,55].We initially conducted a pilot study,which enrolled physicians from primary care centers in other cities of the Eastern Province. Thereafter, the questionnaire was adjusted based on the opinions and suggestions of participating physicians, and reviewed by the authors of this study; the revised questionnaire showed a reliability score of .935.

Limitations

- This study has been conducted in a limited area of the wide country (Saudi Arabia).
- It was conducted to the physicians through an electronic link, therefore there was a misunderstanding of some questions in the questionnaire as mentioned by some responders.

Recommendations

Based on the results of this study, we highly recommend the following:

- To include IBS in PHC training courses in order to increase the evidence based knowledge of IBS.
- To study the prevalence of IBS among patients under the care of PHCs
- To establish local Saudi guidelines of IBS as a clear solid reference for the diagnosis and management of IBS.
- To include dietitians as part of the multidisciplinary team caring for patients with IBS.

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