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PREVALENCE OF IRRITABLE BOWEL SYNDROME IN SAUDI ARABIA, A SYSTEMATIC REVIEW

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Abstract:

Background: *There are several Saudi Arabian reports on the diagnosis of IBS in diverse population situations. The study found that incidence rates varied across the country and that multiple etiological factors could be involved.*

Objectives: *The study aims to summarize current evidences on prevalence, risk factors and management approaches of irritable bowel syndrome in Saudi Arabia.*

Methods: *For article selection, the PubMed database and EBSCO Information Services were used. All relevant articles relevant with our topic and other articles were used in our review. Other articles that were not related to this field were excluded. The data was extracted in a specific format that was reviewed by the group members.*

Conclusion: *IBS prevalence rates in Saudi Arabia ranged between 7.9% in Riyadh and highest 40.7% in Qassim. Factors were significantly associated with IBS as female gender, age, phsycological status, family history, smoking, socioeconomic status as well as other factors. IBS-M was the most common sub-type in Saudi Arabia.*

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INTRODUCTION:

Irritable bowel syndrome (IBS) is a disorder of gut–brain interaction, characterized by abdominal pain associated with a change in frequency or form of bowel habit. Irritable bowel syndrome accounts for more than 40% of new referrals to gastroenterology outpatient clinics, although the disease is mostly managed by primary care practitioners [1]. A review of the literature has shown an increase in the prevalence; ranging from 8.9 to 31.8% in the Arab World. In particular, the prevalence in the recent decade has risen considerably in Saudi Arabia [2].

The pathophysiology of irritable bowel syndrome is incompletely understood, but it is well established that there is disordered communication between the gut and the brain, leading to motility disturbances, visceral hypersensitivity, and altered CNS processing. Other less reproducible mechanisms might include genetic associations, alterations in gastrointestinal microbiota, and disturbances in mucosal and immune function [3]. The best described risk factor is acute enteric infection, but irritable bowel syndrome is also more common in people with psychological comorbidity and in young adult women than in the rest of the general population [4].

Diagnosis of IBS has evolved since its first discovery, and today the Rome IV diagnostic criteria are used to diagnose IBS. Ruling out other conditions that cause similar signs and symptoms is essential for an accurate diagnosis [5]. Depending on the subclass of IBS, symptoms can be managed by a variety of medications and nonpharmaceutical agents. Nonetheless, IBS treatment should be individualized, and a significant factor in management remains a strong patient-physician relationship [6]. Lifestyle and dietary changes, including the low-FODMAP of gluten-free diet, are the first-in-line treatment for all patients [7].

When lifestyle changes do not lead to adequate symptom relief, patients should be treated according to their predominant bowel habits and most prominent symptoms. Laxatives or prokinetics and antidiarrheals are used to treat constipation and diarrhea respectively, but have little effect on abdominal pain [8]. To treat gastro-intestinal (GI) symptoms, antispasmodics can be attributed. Low doses of neuromodulators can help gain control over GI and central symptoms, but are also prone to more severe side effects, restricting their widespread use. Refractory IBS symptoms can be treated with probiotics, antibiotics, histamine-receptor antagonists or alternative therapy, including psychotherapy, hypnotherapy, acupuncture or phytomedicines [9, 10].

Study Objective:

The study aims to summarize current evidences on prevalence, risk factors and management approaches of irritable bowel syndrome in Saudi Arabia.

METHODS:

In this systematic review, enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) statement was used [11].

Study design

A systematic review of the current evidence on irritable bowel syndrome in Saudi Arabia is considered a robust way of identifying and synthesizing the peer reviewed articles for evidence in this area to define a cohesive empirical research agenda that builds on prior knowledge. This review included qualitative evidence only to produce an interpretation. Further, a synthesis of qualitative data aims to generate findings that are meaningful, relevant and appropriate to individuals, to inform a research agenda and ultimately to more effectively influence policy and practices on irritable bowel syndrome in Saudi Arabia. The review used methods of qualitative synthesis to combine, integrate and interpret, where possible, the evidence from the included papers.

The review aims to move beyond the aggregation of available data to provide further interpretive insights into irritable bowel syndrome in Saudi Arabia and define where future research can add to what is known.

Study eligibility criteria

The review included qualitative peer-appraised studies. Qualitative data from mixed methods-studies was screened for inclusion and included if the qualitative element is pertinent. Studies that have been conducted in Saudi Arabia were included. All peer-reviewed articles published in English, reporting prevalence and risk factors of IBS from patient, family, healthcare worker perspective and healthcare delivery system were included. Studies published from January 2002 up to August 2022 only were included to ensure the currency of the work while enabling a broad view of the emerging issues to be identified.

Study participants

The review included all studies that report on IBS from the perspective of all patient categories (adults and children), family and health workers that we came across in the studies on IBS in Saudi Arabia.

Study Inclusion and Exclusion criteria

The articles were selected based on the relevance to the project, English language and geographical restriction to Saudi Arabia was considered. All other articles which do not have one of these topics as their

primary end, or repeated studies, and reviews studies were excluded. The reviewers excluded any studies not available in English, conference abstracts, books or grey literature and editorial comments. Studies reporting only qualitative data were excluded.

Search strategy

A systematic search strategy was developed using a combination of Medical Subject Headings (MeSH) and controlled vocabulary to identify peer-reviewed articles on IBS in Saudi Arabia. The databases were PubMed/MEDLINE, Scopus/Embase (Elsevier), EbscoHost, and Google Scholar. The search was limited from January 2002 to August 2022.

Selection of study

The ENTREQ guidelines [11] for reporting qualitative systematic reviews was used to demonstrate the selection processes and results. All retrieved studies were initially imported into Endnote library to assist removing duplicates. After removing the duplicates, the Endnote library was shared between the two reviewers to independently screen the articles by title and abstract, guided by the eligibility criteria. The studies which the two reviewers would have agreed on was subjected to the full-text review. A third reviewer was adjudicating any discrepancies between the two reviewers. The two reviewers were independently review the full text of all eligible studies. In the case where there are differences between the two reviewers, consensus was sought through discussion on the differences with the third reviewer. Finally, the full texts of all relevant studies found to meet the inclusion criteria was retained for the final framework synthesis.

Data extraction

Data was independently extracted by two reviewers from eligible studies onto a customised data extraction form and populated with variables pertaining to the study population and phenomena of interest. Double checking and verification of extracted articles was done by the third review author. Study characteristics that were extracted included name of the first author and year of publication, data collection period and region in which the study was conducted. Specific study details including the study design, study population, sample size, sampling procedures and data collection procedures then be captured. Prevalence and risk factors of IBS in Saudi population was systematically identified.

Data synthesis and analysis

No software was utilized to analyze the data. The reviewers sorted the data by theme and present the themes in the form of an analysis table (chart). The columns and rows of the table reflected the studies, and related themes and enabled us to compare findings of the studies across different themes and subthemes.

Mapping and interpretation

The reviewers used charts to define the identified concepts and map the range and nature of the phenomena. The review explored associations between the themes to help clarify the findings. The review was maped and interpret findings in line with the review objectives and emerging themes.

RESULTS:

Figure 1 shows the selection and identification of studies. The search of the mentioned databases returned a total of 314 studies that were included for title screening. 213 of them were included for abstract screening, which lead to the exclusion of 67 articles. The remaining 146 publications full-texts were reviewed. The full-text revision led to the exclusion of 129 studies due to difference in study objectives, and 17 were enrolled for final data extraction **(Table 1).**

According to our study results, IBS prevalence rates in Saudi Arabia ranged between 7.9% in Riyadh and highest 40.7% in Qassim [12, 18]. The southern region had a comparable IBS prevalence 14.9% to research conducted in Jazan 16%, which employed the same data collection tool for IBS symptoms measurement [13]. In Hail city a study reported a lower prevalence of IBS (11.8%) [26] than findings in the northern region (18.2%) [14]. Regarding the IBS subtypes, IBS-M (mixed subtype) was predominant in this study [12- 15] followed by IBS-C (constipation subtype) [24, 25, 28].

Female gender, stress, anxiety, and tobacco use were all linked to IBS in a statistically significant manner [12- 17]. Smoking habits, gastroesophageal reflux disease (GERD), food allergy, anxiety, psychological stress, family history of IBS, regular use of nonsteroidal anti-inflammatory drugs (NSAIDs), history of infection prior to onset of symptoms, and residence in the south of Saudi Arabia were also found to be significant risk factors for IBS [19- 28].

The included studies had different study designs.

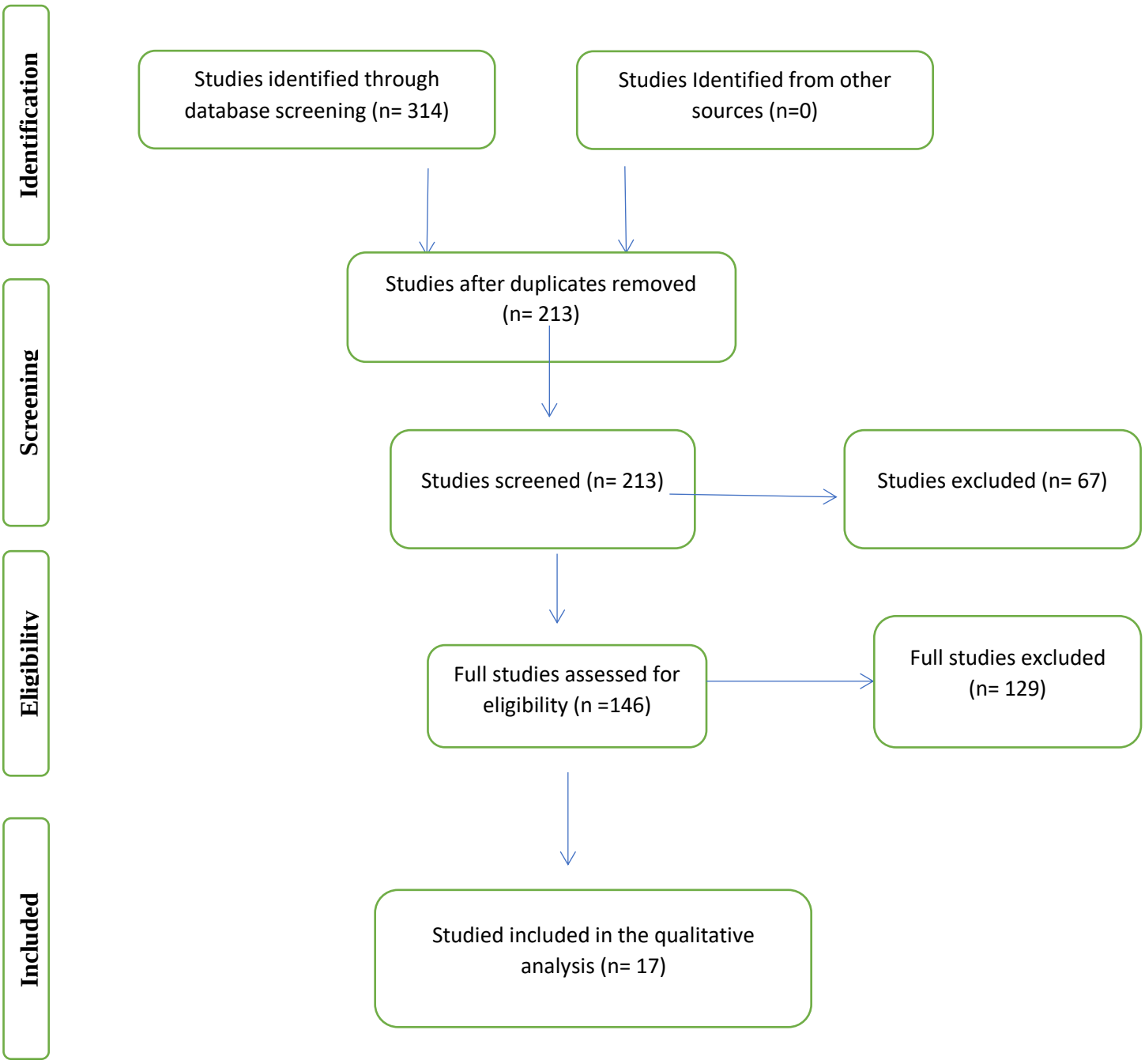

Table 1: Author, country, year of publication, methodology and outcome:

Author, Publishing Year	Study region	Methodology	Outcome
Amin, Hussein S et al. (2021) [12].	Riyadh	In conjunction with an electronic survey disseminated on social media, a cross-sectional study was done in the outpatient clinics of three major hospitals in Riyadh. A questionnaire was completed by 1,319 people (706 men and 613 women).	IBS was identified in 7.9% of people, with 52% having IBS-M (mixed). Women had a higher prevalence than men (4.9% vs. 3.0%). There was a substantial link discovered between the existence of IBS symptoms and poor income and not working. The majority of IBS patients had milk and legume food restrictions, in addition to other types of food and drinks.
Arishi, Abdulelah M et al. (2021) [13]	Jazan	An online cross-sectional survey with 1554 participants was done in the Saudi Arabian Jazan Region from January to March 2020 using a multi-stage stratified sampling technique. A validated Rome IV web-based questionnaire was used to collect the data. The Rome IV criteria are used to diagnose functional gut disorders such as IBS.	The total prevalence of IBS is 16%. Women were more likely than men to have IBS (55.3% vs. 44.7%). The most common subtypes were IBS-mixed (32.66%) and constipation-predominant (32.25%). Female gender, stress, anxiety, and tobacco use were all linked to IBS in a statistically meaningful way.
Alqahtani, Naif H, and Mohammad Eid M Mahfouz (2019) [14]	Different parts of Saudi Arabia	A cross-sectional study was conducted to determine the prevalence of IBS, IBS subtypes, and IBS risk factors in the Saudi general population. The Rome Foundation licenced and designed a questionnaire based on ROME IV criteria. The statistical analysis includes 1,680 eligible people.	In the study, 18.2% of people had IBS. The most common subtype among IBS patients (42.3%) was IBS-M. Smoking habits, gastroesophageal reflux disease (GERD), food allergy, anxiety, psychological stress, family history of IBS, regular use of nonsteroidal anti-inflammatory drugs (NSAIDs), history of infection prior to onset of symptoms, and residence in the south of Saudi Arabia were found to be significant risk factors for IBS.
AlAmeel, Turki et al. (2019) [15]	Dammam	A web-based survey was sent to 594 Board-certified physicians and surgeons in Saudi Arabia. It asked about participant demographics, speciality, practise type, and weekly hours worked. To identify subjects with IBS, the Rome IV-validated questionnaire was employed.	IBS was found in 16.3% of people. Age, gender, and work hours all predicted the existence of IBS in a binary logistic regression model. IBS prevalence was not predicted by marital status or specialty.
Alharbi, Wjdan, and Saulat Jahan. (2022) [16]	Qassim	A cross-sectional survey of 401 female students from government secondary schools was done. Simple random sampling was used to choose two schools. A self-administered Google Form questionnaire distributed to the students' WhatsApp groups gathered biographical data as well as behavioural, lifestyle, and health background factors of the participants. The Rome IV criteria for IBS diagnosis were included in the questionnaire.	The total prevalence of IBS was 21.4%; 11.7% were already diagnosed, but 9.7% were discovered in the study. Factors related with IBS were frequent soft drink consumption, low vegetable consumption, poor mental health, a family history of IBS, and a history of chronic disease.

Aljammaz, K I et al. (2020) [17]	Central region	A cross-sectional study was conducted by the distribution of an online self-administered semi-structured questionnaire via social media and websites. There were 426 people in the sample. The demographic characteristics included in the questionnaire included age, gender, occupation, and marital status. Body mass index (BMI), smoking, family history of IBS, Rome III criteria for diagnosing IBS, and Hospital Anxiety and Depression Scale (HADS) for anxiety and depression were all included in the questionnaire.	According to the Rome III criteria, 130 people had IBS, with a prevalence of 30.5%. Gender, anxiety, sadness, and a lack of physical exercise are all statistically significant risk factors for symptomatic IBS.
AlKhalifah, Muhannad I et al. (2016) [18]	Qassim	A cross-sectional study was done with 300 school instructors who were chosen using a multistage stratified random sample procedure. A confidential, anonymous, self-administered questionnaire was utilised to collect personal and sociodemographic data, as well as questions about instructor performance. The Rome III Criteria were applied. Teachers who displayed red flag symptoms were barred from participating.	IBS symptoms affect 40.7% of the population, with no discernible gender bias. IBS symptoms have a considerable impact on teachers' work performance (61.6%), with a high absenteeism rate (46.6%), particularly among those aged 51-60 years and 21-30 years. A significant proportion (45.3%) of IBS criteria +ve teachers report that IBS symptoms interfere with their daily activities.
AlButaysh, Omar F et al. (2020) [19]	All regions of Saudi Arabia	A cross-sectional study was conducted on 767 undergraduate students from all regions of Saudi Arabia who completed an online self-administered questionnaire. The Rome IV diagnostic criteria were used to examine IBS symptoms.	IBS was found in 15.8% of people. Female sex, being a medical college student, living in a rented flat, living on campus, poor sleep quality, exercise, smoking, a family history of IBS, and emotional stress were all significant independent risk factors for IBS.
Bin Abdulrahman, Khalid A et al. (2022) [20]	All regions of Saudi Arabia	A cross-sectional survey was done on 2802 Saudi citizens aged 15 and up. Participants responded to a self-administered online survey. The Migraine Screen Questionnaire (MS-Q) for migraine symptoms, the migraine severity (MIGSEV) scale for migraine severity, and the IBS module of the Rome IV Diagnostic Questionnaire (R4DQ) for IBS symptoms and subtype were used to collect data.	IBS was found in 16.4% of people. The odds of having IBS were substantially higher in migraineurs than in individuals who did not have migraine, and the link was statistically significant.
Ibrahim, Nahla Khamis Ragab et al. (2013) [21]	Jeddah	In 2012, a cross-sectional study was done with 597 medical students and interns chosen using a multistage stratified random sample procedure. During the previous 6 months, a confidential, anonymous, and self-administered questionnaire was utilised to collect personal and sociodemographic data, level of emotional stress, and food sensitivities. In addition, the Rome III Criteria and the Standardized Hospital Anxiety and Depression Scale were used.	IBS was found in 31.8% of people. Female gender was the first predictor of IBS. The existence of morbid anxiety was the second predictor. The following indicators were living in a school dormitory, emotional stress in the six months preceding the research, and the academic year.

Alaqeel, Meshal Khaled et al. (2017) [22]	Riyadh	The Depression Anxiety Stress Scales-21 (DASS-21) and Rome III criteria were used in the cross-sectional observational study. The sample size was 270, and proportionate allocation was utilised to distribute this sample among the study population based on percentages of students in each academic year. Participants were chosen using convenience sampling.	The total prevalence of IBS was 21%, with females having a greater prevalence (26%), than males (19%). IBS was most common (14%) among first-year students and least common (29%) among fifth-year students. In 39%, 7%, 26%, and 27%, anxiety levels were normal, mild, moderate, severe, or extremely severe. Gender and IBS were found to have a strong relationship, as were anxiety levels and IBS.
Bardisi, Bandar Mohammed et al. (2018) [23]		This study was a cross-sectional study. A questionnaire was developed for data collection in the present study. The study included 1202 subjects	The statistical analysis revealed a strong relationship between having IBS for three consecutive days for three months, age and length of IBS, having depression or anxiety before, and whether or not the depression worsens IBS symptoms. Having a dietary regimen, advising to boost fibre, and considering altering food all help to improve IBS symptoms, as does treatment.
Ibrahim, Nahla Khamis et al. (2016) [24]	Jeddah	A cross-sectional study was carried out on 229 nurses who met the eligibility requirements. Stratified random sampling was used to pick them between 2014 and 2015. Personal and sociodemographic data were collected using a verified, confidential, self-administered data collecting sheet. The Rome III Criteria, the IBS Severity Scoring System (IBS-SSS), the Hospital Anxiety and Depression Scale (HADS), and the Pittsburgh Sleep Quality Index (PSQI) were used. Statistics were computed using both descriptive and inferential methods.	The incidence of IBS among nurses was 14.4%, with IBS-Mixed being the most frequent kind (54.5%). Working in outpatient clinics, working day shift, poor sleep quality, and high anxiety and depression scale scores were all substantially linked with IBS. Food hypersensitivity, morbid anxiety, and a positive family history of IBS were the predictors of IBS after correcting for confounding factors in regression analysis.
Ahmed, Saif Ahmad Shamshuddin, et al. (2020) [25]	Riyadh	The 472 participants in the cross-sectional study were from the Faculty of Medicine at Imam Mohammad Ibn Saud Islamic University (IMSIU) in Riyadh, Saudi Arabia. 480 students from all academic years and both genders were given a self-administered questionnaire.	Altogether, 12.6% of students indicated responses consistent with an IBS diagnosis: IBS-M subtype (48.6%), IBS-D (21.7%), IBS-C (21.7%), and IBS-U (8%). There was a statistically significant relationship between the prevalence of IBS and smoking, and women and third- and fifth-year students had a greater frequency of IBS.
Alshammari, Omar Mohammad, et al. (2018) [26]	Hail	a cross-sectional study on the prevalence of irritable bowel syndrome was randomly distributed among men and women in Hail University involving 133 medical student participants.	in 18% of the participants have been diagnosed with IBS and 28.5% fit Rome IV criteria for the diagnosis of IBS. Stress with a percentage of 69.2% and lack of exercise 75.9% being the highest risk factors of IBS.
Al.qarni, Ahlam, et al. (2019) [27]	Jeddah	A cross-sectional descriptive study was conducted among 193 undergraduate nursing students (second, third and fourth years) at King Abdul-Aziz university	The results showed that 17.6% of nursing students at King Abdul-Aziz having IBS.

SAAD ALSHAHRANI, M. D. (2020) [28]	Najran	A cross-sectional study design was followed included 400 Male Secondary School Saudi students in Najran City, Saudi Arabia. A self-administered questionnaire was used for data collection. It included personal characteristics, and the IBS questionnaire.	A total of (39.8%) reported IBS-like symptoms. The most prevalent kind was IBS with alternate diarrhoea and constipation (i.e., IBS-M), followed by IBS with diarrhoea (7.3%) and IBS with constipation (6.3%). Some factors, such as a positive family history of IBS and diabetes mellitus, were associated with a considerably greater frequency of IBS among male secondary school students.

DISCUSSION:

During the last two decades, the definition of IBS has evolved, mostly due to expert opinion and based on research that revealed symptoms that distinguished individuals classified with IBS from those with organic disease, as well as factor analyses that showed distinct symptom clusters [3].

The absence of red flag (alarm) symptoms such gastrointestinal bleeding, weight loss, fever, anaemia, or an abdominal mass supports IBS rather than structural disease. Other concomitant illnesses, such as gastro-esophageal reflux, genito-urinary symptoms, fibromyalgia, headache, backache, and psychiatric symptoms, may occur more frequently than predicted in patients with IBS. As a result, IBS can present to a variety of subspecialists and is frequently misdiagnosed at first [9, 10]

IBS affects around 10-20% of persons worldwide [29]. A systematic evaluation of 53 studies using the Rome III criteria that included patients from 38 countries revealed a pooled prevalence of 92% [30], which is similar to our findings. Using the Rome III criteria, another study in Iran found a substantially lower frequency of 1.1% [31]. IBS prevalence ranged from 15% to 24% in the general population of Western countries [32]. Hungin et al. (2003) conducted an international survey involving 41,984 people from eight European nations and discovered an 11.5% prevalence of IBS [33].

The underlying prevalence of symptoms in communities around the world is likely to be the same, around 11%, with variations reflecting differences in access to health care and acceptability of a diagnosis, both to the physician making the diagnosis and to the patient receiving and believing it [34, 35]. One possible explanation for the disparities in results is that the Eastern countries utilised Western criteria for diagnosing IBS, which have not been validated for the culture and language of the country in which they were used. Other factors that could contribute to these inconsistencies include the adoption of distinct sets of criteria, a small target population size, and ethnic variations [31].

IBS is a clinically diverse illness that can be further subdivided into more precise diagnoses such as IBS-D, IBS-C, and IBS-M. The prevalence varies according to location. The majority of previous research has shown IBS-M as the most frequent subgroup. We discovered IBS-M to be the most prevalent subgroup using the Rome IV criteria, which is consistent with the bulk of previous investigations [30, 36].

Psychological risk factors play a significant influence in predisposing people to IBS [37]. The current study found that one in every three IBS-categorized patients experienced stress and/or anxiety, with a statistically significant connection with IBS (p-value 0.05). Similarly, three local research in Saudi Arabia found a substantial link between IBS and stress and anxiety [22, 23]. Stress, anxiety, and excessive catecholamine levels all disturb the brain-gut haemostasis. Furthermore, like with many functional GI illnesses, brain-gut interaction dysregulation alters gut motility, visceral sensitivity, neuropeptide hormone release, and gut flora, ultimately leading to the presentation of IBS [38].

Naeem et al. [39] conducted a study in Karachi, Pakistan, to assess the prevalence and related variables of IBS among medical students. They discovered that 55.8% of IBS individuals experienced anxiety-related psychological symptoms. Individuals with IBS in Japan had higher HADS scores than the control group, according to Sugaya et al. 2008 [40]. Several more research [42- 44] revealed similar findings. These findings emphasise the importance of focusing on both psychological and physical variables in the treatment of IBS.

Emotional stress was prevalent in IBS individuals and significantly predicted IBS prevalence [13, 14, 19, 21, 22]. The role of stress in IBS is widely known. Emotional stress has been shown in clinical and

experimental studies to have a significant impact on intestinal sensitivity, secretion, motility, and permeability, with the underlying mechanism correlating with mucosal immunity activation, alterations in central and peripheral neurons, and gastrointestinal microbiota. Changes in neuroendocrine-immune pathways caused by stress affect on the gut-brain axis, causing or exacerbating IBS symptoms. IBS is a stress-sensitive disorder, thus treatment should focus on stress management and stress-induced responses [42, 45].

This could be explained by the countries' shared cultural background. Physical and psychological stress are important factors in IBS pathogenesis. The relationship between higher education level and IBS could be explained by the fact that, first, these individuals are likely to be under a lot of stress due to the tremendous academic load during their studies, and second, the number of suitable occupations for highly educated people is less, which requires more effort from them to find a suitable job, which can lead to further stress and anxiety, which is known to be associated with IBS [37, 45].

Regardless of the diagnostic criteria used, women report greater IBS symptoms than men in most groups [46]. Women's rates are generally 1.5 to 3 times greater than men's [47]. Internationally, women have a 67% higher prevalence of IBS than males. This relative difference represents an absolute difference in prevalence of slightly more than 5% between the sexes, with women having a prevalence of 14.0% compared to 8.9% in men [48, 49].

IBS affects people of all ages, including toddlers and the elderly, and there is no difference in the prevalence of subtypes by age [50]. However, 50% of IBS patients report having first experienced symptoms before the age of 35, and prevalence is 25% lower in those over 50 than in those younger. This would imply that symptoms fade over time, which contradicts the popular idea that IBS is a chronic lifelong ailment, because if this were the case, prevalence would be constant or grow with age [51].

A study found that IBS was associated with lower socioeconomic status [52], which is consistent with the hypothesis that lower income is associated with poorer health care outcomes, lower overall quality of life, and higher life stressors [53]. Others argue that being in a higher socioeconomic category during childhood is related with a higher prevalence of IBS. Similarly, locations with a lower proportion of manual labourers have greater incidence of IBS. This is thought to be linked to the higher amount of stress experienced by those in professional and managerial roles [54].

IBS has a significant impact on those who suffer from it. For a cure, the average patient would give up 10 to 15 years of their remaining life expectancy. Subjects with IBS reported poorer capacity to do physical exercise compared to their healthy colleagues in a study conducted in the United States. Their quality of life suffered as a result. IBS patients in the United States require six blood tests, one radiographic study, and one outpatient operation in the year following their diagnosis.

CONCLUSION:

IBS prevalence rates in Saudi Arabia ranged between 7.9% in Riyadh and highest 40.7% in Qassim. Factors were significantly associated with IBS as female gender, age, phsycological status, family history, smoking, socioeconomic status as well as other factors. IBS-M was the most common sub-type in Saudi Arabia. Given that many of the risk factors are controllable, interventional studies are required to investigate potential treatments for the high incidence of IBS.

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